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STEEL

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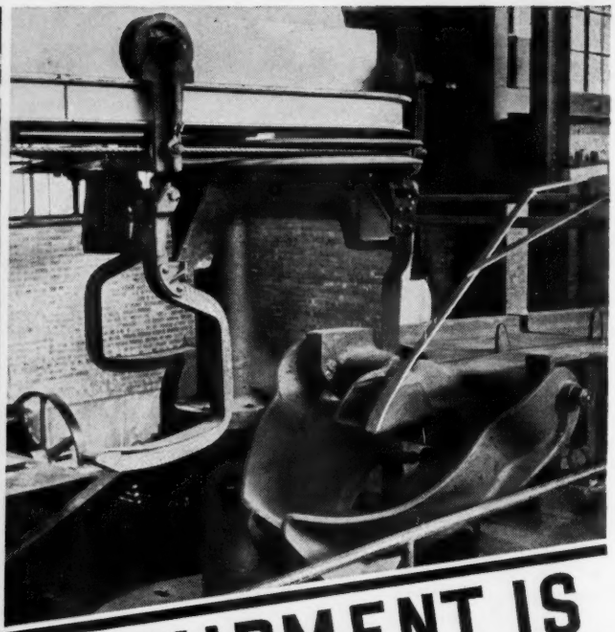

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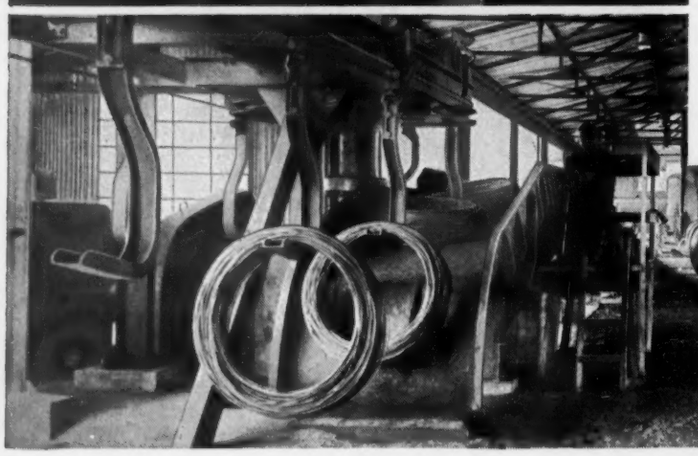

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STEEL
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As the Editor Views the News

■ ANOTHER all-time tonnage record was established last week (p. 31) when steel output rose ½-point to 93½ per cent of ingot capacity. Steel shipments now are in excess of new orders (p. 85) so that increased demand will be needed either from domestic or foreign sources to maintain the present rate indefinitely. Present backlogs are slow to decline and many buyers are urging the mills to make deliveries, so that operations are bound to continue at a high rate for some time. . . What about speculative buying? STEEL'S survey (p. 23) reveals that steel inventories in consumers' hands on Oct. 31 were 12.2 per cent higher than on Aug. 31. Seventy-six per cent of consumers on Oct. 31 had enough steel to last them for a few days to three months, at present and anticipated rate of consumption.

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Industrial Canada

Industrialization of Canada to prepare it for large-scale production of war materials (p. 45) is proceeding at a feverish pace; much of it is of direct interest to United States manufacturers. A British purchasing commission, reported as ready to spend $1,000,000,000 for airplanes, machine tools and other items, has set up temporary headquarters at 25 Broadway, New York. . . United States naval expansion at a cost of $1,300,000,000 is authorized in a bill to be laid (p. 33) before the reconvened congress. . . Steel hearings before the temporary national economic committee (p. 25) were adjourned last week until early in January. . . Sheet prices (p. 27) should be increased, says Charles R. Hook. . . Use of flat-rolled steel in house construction (pp. 30 and 44) is increasing.

• • •

Backlogs Increase

Kansas City Southern is the first railroad (p. 35) seeking to round out its service with an air arm. . . United Engineering & Foundry Co. will build equipment (p. 44) for applying Robert E. Kinkead's process for manufacturing stainless clad steel at cost not out of line with plain carbon steel; this process was described in STEEL of Jan. 30, 1939, p. 38. . . River mills (p. 44) soon will be able to barge steel to Corpus Christi, Texas. . . Annual capacity of the airplane industry (p. 35) has mounted to 15,000 planes and still is rising; the industry's order backlog continues to mount to new heights. . . Second southern blast furnace (p. 31) is being air conditioned. . . Men in the union ranks in Detroit's automobile industry (p. 37) are becoming resentful over conduct of their leaders.

• • •

Preventing Accidents

Unconventional machining methods not only frequently are practical but, says Guy Hubbard, STEEL's machine tool editor (p. 50), they often pave the way for standard practices of the future. . . . A recent analysis of industrial accidents revealed eye accidents were 5.31 per cent of the total, also that 72 per cent of all eye injuries occur on jobs generally regarded as non-hazardous to eyes; effective eye protection (p. 52) leads to sharp reduction in accident compensation. . . . A new automatic, continuous spotwelder (p. 62) welds 450 units per hour; it has a built-in conveyor and other features. . . . By a new process, die castings (p. 63) now are cold formed after casting; it permits production of hollow die castings. . . . A new silicon bronze alloy is available (p. 71) for cold heading.

• • •

Welded Piping

Results of air conditioning a Woodward Iron Co. blast furnace bear out the soundness (p. 54) of previous theory as to the benefits of dry blast. Burden has been increased, an important reduction in coke per ton has been effected and silicon content of the iron responds to the lowered moisture content. . . . Highly efficient is a welded piping system which furnishes water for cooling the electrical equipment which (p. 64) drives the slabbing mill at the Edgar Thomson works. . . . Laboratory tests (p. 66) indicate how adherence of finishes on zinc surfaces may be improved. . . . Extreme-pressure portable cementing pump of a new type (p. 70) is commercially feasible because of modern alloy steels. . . . Gas-fired unit heaters at one plant (p. 74) reduced fuel and maintenance costs 53 per cent.

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RYERSON CERTIFIED STEELS

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Consumers' Steel Inventories Gain 12.2 Per Cent in Two Months

Three-Fourths Have 90 Days' Supply or Less . . . Stocks No More Than Normal, Majority Say . . . Further Moderate Increase Indicated for Remainder of Year

■ CONSUMERS increased their steel inventories an average of about 12 per cent between Sept. 1 and Nov. 1. In most cases this was necessitated by a corresponding or larger upturn in consumption.

More than 25 per cent of all companies reduced their inventories during the two months.

Three-fourths of all buyers had sufficient steel on hand Nov. 1 to last 90 days or less, based on anticipated operations. Supplies as of that date generally were considered no more than normal but probably will be enlarged the remainder of the year by steel on order or in process of delivery.

Delays in mill shipments are causing many users to order steel farther ahead than usual, but such buying is predicated on indicated needs.

These conclusions summarize results of a survey just completed by STEEL to determine the extent to which inventories of steel have been built up at consuming plants since outbreak of the European war. Representative metalworking companies, including steel processors and consumers of finished steel products, were questioned regarding the dollar value of their steel inventories as of Aug. 31 and Oct. 31. They were also asked to state how long their present steel stocks would last at their present and anticipated rate of operations.

Replies from more than 300 companies listed total steel inventories as follows:

Aug. 31	$13,564,579
Oct. 31	15,212,687
Per cent increase	12.2

Relatively few companies reported their steel stocks would last more than three months. Percentages of the total number of consumers indicating the various periods of duration for their inventories were:

	Per cent
One month or less	21.8
One to two months	26 5
Two to three months	27.8
Three to four months	9.4
Four to six months	10.3
Over six months	4.2

In order to determine whether inventory appreciation was uniform among all companies regardless of size, the replies were analyzed in four groups. These included consumers with inventories of more than $100,000; those with inventories of $50,000 to $100,000; inventories of $25,000 to $50,000; and inventories of less than $25,000.

Total steel stocks of these groups at the end of August and October, and percentage change for each, were:

	Aug. 31	Oct. 31	Increase, Per Cent
Over $100,000	$8,965,473	$9,900,141	10.4
$50,000 to $100,000	2,068,642	2,412,332	16.6
$25,000 to $50,000	1,397,464	1,675,866	19.9
Under $25,000	1,133,000	1,224,348	8.1

These figures indicate the users carrying either the largest or the smallest stocks increased their inventories less than did the medium-size groups. This is also reflected in the number of individual companies in each classification which enlarged their holdings. Only 65 per cent of the largest and 60 per cent of the smallest interests boosted their supplies in September and October, but 75 per cent of those in the $50,000-$100,000 group and 83 per cent in the $25,000-$50,000 classification added to their stocks. Among all companies 68 per cent showed increases during the period,

Smoke Over "The Valley"

■ **At the left, just above bridge are Republic's blast furnaces, and across the Mahoning river, its open hearths and mills. At the top, veiled by smoke, are Youngstown Sheet & Tube's plants. Steelworks in the Youngstown district, of which this is only a part, recently have been operating above 90 per cent. Despite this burst of speed, advocates of the Youngstown-Ohio river canalization plan point out no new large steelworks have been built here in 20 years, due to rail freight disadvantages, which they hope to overcome by means of a canal, bringing in coal, shipping out steel to the Ohio, thence to the Gulf**

26 per cent had reductions and 6 per cent reported no change.

In an attempt to prevent distortion of the survey's totals, individual figures which, for special reasons, showed wide swings in inventory changes were eliminated from this compilation. For example, certain large equipment fabricators generally carry only sufficient stock for projects on order. In some cases such consumers had large inventories Aug. 31 but by Oct. 31 had completed work at hand and steel inventories were scant, pending receipt of additional orders which again would require a building up of supplies.

While the increase in inventories during the 61 days prior to Nov. 1 was small, considering the upturn experienced by metalworking operations, the current record-breaking pace of finished steel shipments points to at least a moderate growth in stocks the remainder of this quarter. One company says: "Our inventory will be higher this month and next because our stock is just starting to come in." Another says its stock would be practically exhausted by mid-November, but steel on order and to be shipped represents about a three-months' supply. In similar vein a manufacturer reports its steel stocks will last only about two weeks, but "orders coming in this month will last through first quarter."

A consumer reporting below-normal inventory—a 30-day supply—says it has bought for five months, although the material has not yet been received. Several other users also are awaiting shipment of steel intended to cover their needs through next March. A somewhat extreme case is a company which reports a stock good for 45 days but admits the steel it has on order for immediate release will cover its requirements for seven months.

Steel Deliveries Slow

On the other hand, one large interest expects little inventory appreciation in the near future, remarking that "with conditions of deliveries as they are today with the large producing mills, there will be very little opportunity to increase inventories during the present quarter."

The delivery situation is regarded by many as necessitating inventory enlargement and more extended forward coverage. One leading user states: "Our present inventory is not excessive at our current production rate and in view of slow deliveries from steel mills." A large structural fabricator declares its inventory is subnormal, considering the probable slight increase in fabricated orders, together with the present condition of the mills with reference to quick deliveries; further, that inventories must be held at least to the Nov. 1 level in order to maintain operations at the present rate.

Another company takes the following similar view: "We ordered additional tonnage the last of August, and it came in during late September and early October. Most of the tonnage we have placed is now for early January delivery as we take our inventory Dec. 31. We are not rushed but are comfortably busy. The condition of the mills, however, is such that in order to protect a normal production it is necessary to order a long time ahead and carry a larger inventory than usual."

Typical Remarks

Other comments on mill deliveries are these:

"We always keep a nine to ten weeks' supply ahead and normally specify six to eight weeks ahead. This time we specified steel up to April 1 as the mills are overloaded."

"Due to available volume of business, steel inventory had to be expanded. We really require at least twice our present inventory. Mill deliveries have been abominable."

"We are having a hell of a time getting deliveries. Some steel companies apparently are favoring the large buyer to the detriment of their bread and butter customers who year in and year out use approximately the same amount of steel each year, regardless of price trends."

"We will have to have replacements in 30 days or be out of certain sizes. We have had orders out since August for three carloads."

"Replacement stock was ordered from the mill Sept. 12. It cannot be rolled until the last week of December."

One buyer deplores the necessity for buying so far in the future. It reports a six-months' inventory which it states is about minimum for its operations and states that in addition to covering for first quarter it is placing an order for additional tonnage to be shipped the second quarter of next year. However, it declares this latter purchase represents high pressure salesmanship on the part of the mill, continuing: "As we must have steel to operate and the mill refused to guarantee delivery for the second quarter unless the tonnage was placed this week, we have no alternative but get our orders in. The steel firms may be right in loading up their mills with all this future delivery, but our guess is that they will have a headache along about June 1, if consumption doesn't increase very materially."

A small manufacturer explains its reduction in inventory by citing difficulties in getting deliveries from mills, pointing out that steel on order and not shipped as of Oct. 31 exceeded stocks on hand as of that date. A relatively large sheet user reports scant stocks, adding that it is picking up material from warehouses while waiting for carload shipments from producers.

It is obvious that what is regarded as a normal inventory varies with different types of consumers. For instance, one equipment maker with a stock estimated to last six months says: "We have not been increasing our inventory to any extent since the outbreak of the war in Europe, but are maintaining fairly large stocks, as we have done for some time past."

A number of other important users assert they have adjusted their inventories and steel purchases only in accordance with variations in actual requirements. The following remarks are typical:

"Our present inventories are about the same as five months ago, and while we have outstanding unfilled orders for about $150,000 worth of steel, our inventory is probably only about normal for the volume of business we are now getting."

"We are not ordering any further than our usual requirements on steel, which at the present time would include our requirements up to April 1, next year. We plan on having from five to six months' supply on hand or on order at all times. We consider the present market conditions as not warranting heavier or further coverage."

"Inventories today are the same as two months ago. We are using steel as fast as it comes in."

"No Indicated Accumulation"

"Some of our stocks will run us three months; but we will need considerable more of certain sizes. The evidence so far indicates there is no accumulation of inventories."

"We have on order with mills probably $30,000 worth of steel, at least half of this needed for orders on hand. Inventory shows only a slight increase, as we are using steel as fast as received."

"Sufficient tonnage on order coming in from mills to keep our current stocks to usual tonnage. Have not stocked above normal in anticipation of advancing prices or shortage."

"Our inventory is as low as it is possible for us to operate on."

"Our increase (in inventory) is only in ratio to increased orders."

"We are pleased to advise that we have purchased only the necessary steel for orders that we have booked and have bought none of the material for inventory."

TNEC Steel Hearings Adjourned; Will Be Resumed Early in January

WASHINGTON

■ STEEL hearings before the temporary national economic committee were adjourned Nov. 15 to early January. At that time surveys made for the United States Steel Corp. by Dr. Theodore Yntema, University of Chicago, and reported to contain interesting new information on the steel industry, will be presented.

At the January hearings, A. H. Feller, department of justice, will present statistical data gathered from replies to questionnaires sent to 50 steel companies several months ago. Mr. Feller explained the data were not yet tabulated but would be given the committee in report form. Copies also will be sent to steel companies to give them an opportunity to reply if they desire.

Scrap figures prepared by the bureau of mines also will be presented by Mr. Feller.

Steel export situation was explained last week by S. M. Bash, vice president, Bethlehem Steel Export Corp., New York, and a member of the board of managers of the Steel Export Association of America, and by Henry Schroeder, Wheeling Steel Corp., Wheeling, W. Va., and former manager of the association.

Mr. Bash related the history of the organization of the export association and discussed the relation of the United States steel industry to world markets. He said the association was composed of steel manufacturers of the United States, organized under the Webb-Pomerene export act of 1918.

Membership includes: American Rolling Mill Co., Middletown, O.; Inland Steel Co., Chicago; Jones & Laughlin Steel Corp., Pittsburgh; Newport Rolling Mill Co., Newport, Ky.; Pittsburgh Steel Co., Pittsburgh; Spang, Chalfant & Co., Inc., Pittsburgh; Republic Steel Corp., Cleveland; Youngstown Sheet & Tube Co., Youngstown, O.; Wheeling Steel Corp.; Weirton Steel Co., Weirton, W. Va.; United States Steel Export Corp.; and Bethlehem Steel Export Corp.

Association was formed in May, 1928. After Mr. Feller read into the record extracts from the Webb-Pomerene act, Mr. Bash explained the foreign steel trade conditions prevailing before the association was established.

Prior to the association's formation, said Mr. Bash, United States steel companies could not agree on prices for export and were at considerable disadvantage in their foreign trade. Establishment of the association eliminated much useless competition. Since the association has been in existence steel companies have been successful in their export business and have obtained an "excellent proportion of the world's steel business."

Mr. Bash discussed the agreements made through the association between the United States steel companies and foreign cartels. He told of the pipe agreement, which he stated is not now in existence, the oil country goods agreement, tin plate agreement, and a general export agreement covering merchant tubular products. All agreements, he said, were consummated through the association.

Some of the important agreements expired in 1935, and pressed as to the reason, Mr. Bash said he thought it was because of a disagreement between Germany and France.

War Precludes Agreement

Witness also told of the so-called Welsh tin plate agreement and the international tin plate agreement, which, he said, had twice been superseded. Further agreement is not in sight because of war conditions. He spoke also of the proposed agreement for heavy goods and sheets and said these included bars, plates, structural shapes, wire rod, skelp, and semifinished material for heavy goods and hoops, cold-rolled and black sheets and galvanized sheets.

Mr. Bash described a typical agreement between the American association and the foreigners, the fixing of quotas and prices. The agreements stated what the quotas were, in terms of percentages and sometimes tonnages, but price was determined on the basis of general circumstances and competition.

United States steel manufacturers, he said, "roam the world" for markets. However, in their agreements through the association, they agreed not to sell in the home markets of the Europeans. Mr. Bash told the committee the agreements had nothing to do with the tariff.

United States clauses, including a section of the Webb-Pomerene act itself, were written into the agreements, Mr. Bash explained. He discussed also the purposes of the association and its practical effect.

In 1937 the United States was a large steel exporter because there was heavy foreign demand. It also was a good domestic year. Exports in 1938 were much lower than in 1937. The witness told the committee that in 1938 the European mills were operating at from 40 to

Rejects "Any Untried Theory"

■ **After testifying before monopoly committee, (left to right, foreground): H. L. Hughes, vice president, United States Steel Corp.; Benjamin F. Fairless, U. S. Steel's president; Dr. H. A. Baker, president, American Can Co.; A. R. Pfeltz, vice president, American Can. Mr. Fairless told the committee his company would co-operate with the government to provide constant and regular employment, warned against "any untried theory" to achieve this goal. Acme photo**

50 per cent of capacity, England excepted.

United States mills, he declared, have always endeavored to hold their export quotas.

Mr. Bash told the committee 1937 was a seller's market while 1938 was not. Europeans can sell in the world markets at a lower price, the witness stated, because, for one thing, they operate as a unit. United States mills could bargain better if they acted as a unit.

Mr. Schroeder was questioned regarding letters which Mr. Feller introduced. They were written by Mr. Schroeder in April and February of 1938, and dealt with the working of the association and some of its problems. Committee officials tried to show through these letters that there was a restriction on imports through the association's activities and it was pointed out that this was specifically contrary to the Webb-Pomerene act.

Mr. Bash told the committee that in his opinion if there had been no export association in 1938 that foreign steel business would not have amounted to even as much as it did. American manufacturers would have had to contend with unrestricted competition from Europe.

In a memorandum prepared by Mr. Schroeder for the board of managers of the export association introduced by Mr. Feller, it was said that:

"The American party must negotiate for freedom from responsibility to the heavy steel group for shipments by American outsiders, during whatever period of time may be required to negotiate with these outsiders and to obtain their participation in the agreement, either as active or as associate members. With present outsider activity, we cannot be responsible for them. When all outsiders have joined up, there will be no problem. In the meantime, it is suggested that much the same clause be employed as at present under the tin plate agreement, mentioned in the attached report.

Exports Direct from Mills

"Furthermore, with a view to diminishing the opportunities offered to outsiders, it is recommended that responsible brokers, jobbers, or export merchants be licensed by commission agreements with the association to deal exclusively with its members. License would be offered upon nomination by any member. At present, the brokers seek connection with outsiders, and contrive to defeat the purposes of the association. It is hoped that the licensing plan will insure the co-operation of the worthwhile merchants."

Questioned on this memorandum Mr. Schroeder said that the broker and merchant clause suggested was never put into effect by the association. He explained brokers and merchants do not enter into the picture in the export business in the United States as they do abroad. Exports are sold direct by mills.

Question of freezing out non-members of the export association was discussed by witnesses and committee members. In this connection a letter was read into the record from C. E. Masters, assistant to the vice president, Bethlehem Steel Export Corp., to John Outwater of the export association. Among other matters this dealt with non-members of the association and it was suggested European cartels reduce their steel price to keep the "outsiders" or non-members of the association from getting into the export market under the association's "umbrella."

"Outsiders" Disturbing Element

Leon Henderson, securities and exchange commission member of the committee, suggested the language of the letter indicated the association was taking action to stop the competition from the non-members in the export market. He called attention to the fact that this is prohibited by the Webb-Pomerene act. It was brought out during the discussion that non-members were getting more export business than the members of the association. Committee members said that the various letters seemed to indicate the association members were either trying to get the non-members of the association to join the association or to get the export market reduced to drive the outsiders out of the export market.

Mr. Bash suggested many of these non-members of the association were "in" and "out." He explained this by stating that if the domestic market was very good, they did not care for export business. The American "outsiders," Mr. Bash told the committee, were a disturbing element in the export business.

Mr. Henderson indicated he thought federal law had been violated by the steel export association in its dealings with other members of the international steel cartel.

Addressing Mr. Bash, Mr. Henderson declared: "You wanted help from foreigners to restrain the exports of your competitors. I don't know how you can reconcile that with the specific language of the Webb-Pomerene act."

Mr. Henderson's charge was based partly on a letter in which an association member had written of efforts "to eliminate the American outsider."

Denying that it was a question of elimination, Mr. Bash explained that the association was subject to heavy penalties payable to other members of the international cartel if American exports exceeded the allotted quota. He pointed out the association "assumed responsibility" for all steel exports, whether from association members or not.

Mr. Bash insisted that the association was merely asking to be relieved of the penalties due when the United States exceeded the quota.

"You proposed that Europeans take action to eliminate your American competitors," asserted Joseph J. O'Connell of the treasury department. "Your purpose was either to force the outsiders into the association or eliminate them from foreign business."

"There was no intention or expectation that we could eliminate anybody from competing in the export trade," the witness said. "Far from restraining them, they grew up like mushrooms," he added.

In one of the rare instances during the hearing when he has shown any emotion, Mr. Feller said:

"You were asking foreigners to cut prices in order to keep American outsiders out of competition. The foreigners refused, and I say, 'Good for them'."

"The fundamental question," Mr. Feller declared, "is if the Webb-Pomerene act is adhered to, is it possible to have an export association at all?"

Asserting that the small companies participated in the export business only when the cartel's price was high, Mr. Bash asked whether "a few companies, not seriously interested in the export business, should be allowed to disrupt the export trade?"

Mr. Bash defended American dealings with the international cartels as he declared: "If there were no cartel, our foreign markets would be greatly reduced, and many steel mills in the United States would come to the point where they just couldn't stand the gaff of foreign competition."

Tells of Rolling Mill Licenses

Charles R. Hook, president, American Rolling Mill Co., returned to the stand last week and was questioned on prices.

He also told of patent licenses on continuous rolling mills. He pointed out the price on certain products has declined materially since the building of continuous mills.

Mr. Hook discussed the price clauses in his contracts with other steel producers using his patent. He stated there is a power to set a minimum price on the basis of what would protect the interests of his company. He defended his company's right to include "a minimum price" in agreements for competitors to use the company's patented process of rolling steel into sheets.

Mr. Hook explained the American

Rolling Mill Co. patented its process for rolled steel sheets in 1925 and then licensed this method to competitors in this country and Europe, on a royalty basis.

The witness said that the new process had cut costs of automobile fenders from $135 a ton under the old hand-labor method in 1923 to $59 a ton this year.

Mr. Hook said a minimum price was included in the license agreements because of the possibility some competitor might use the process to cut prices and "ruin" the sheet steel business of the American Rolling Mill Co.

"It took us a good many years and hundreds of thousands of dollars to develop this process," he testified. "We took a great risk and we believe we are entitled to some protection."

The witness presented data to show the patented process "resulted in better products, lower prices, higher wages, shorter hours and more employment."

During the course of Mr. Hook's testimony, Mr. Feller referred to a letter from Mr. Hook to A. A. Berle Jr., of Columbia university, now assistant secretary of state, dealing with a Berle memorandum to TNEC making certain suggestions.

Mr. Feller referred to certain sections of the letter as follows:

"Earlier in this letter I mentioned our business interests in England and our association with English manufacturers. This experience and my recent studies as a member of the commission appointed by the President to investigate industrial relations in England has impressed me with the difference in the way we have generally attempted to make changes affecting our industrial system.

"As you know, over there when an important change or study is contemplated, a royal commission is generally appointed with an outstanding, able and impartial chairman, together with equal numbers of parties in interest. Plenty of time is taken to make a thorough study and investigation before conclusions are drawn by either the commission or the government.

Need More Co-operation

"No sensible industrialist would contend that there must not be certain proper regulations of corporate activities; however, we cannot peg wages or continue to increase wages if management is denied the right of group co-operation with respect to prices.

"In England the right of employers to co-operate with respect to price and allocation of business is not denied and, therefore, there is greater opportunity for employers to co-operate with employe organizations with respect to wages, and the public is protected against the combination of employer and employe organizations through the operation of the import advisory committee.

"Please do not misunderstand me. I am not advocating the British system for the United States. I have simply brought these several matters to your attention to indicate the many factors that must be taken into consideration and how carefully the whole field must be studied if Senator O'Mahoney's committee is to make a report that will be of real value in helping to create a situation that will encourage and not destroy individual and corporate initiative and that will raise and not lower the standard of living of the average citizen."

Mr. Hook expressed the opinion, in answer to questions by the committee, that business management should be granted group co-operation with regard to prices. That management should be allowed to discuss the relationship between cost and prices. He stated specifically, however, that he does not recommend meetings of industry for price-fixing purposes.

The witness spoke of the import advisory body of England. Taking steel for an example, he said the import committee would study the steel industry, and if the committee considered prices too high, would call this to the industry's attention. If the industry did not lower its prices, the matter would be called to the attention of the government which would reduce the tariff and this would automatically reduce prices through the importation of competitive material.

The British government Mr. Hook said, does co-operate very closely with industry and business is encouraged by real co-operation with the government. This does away, said the witness, with many of the peaks and valleys common in the the United States business.

Specialty sheet prices are set six months in advance in Britain. In Germany also there is co-operation between industry and government, said Mr. Hook.

Advises Consultations

He testified that during 1937 and 1938 his company exported about 8 per cent of its production.

Mr. Hook admitted, under questioning of the committee, that United States manufacturers could not operate under the British system. Also he told the committee he is not in favor of changing the antitrust laws nor of changing our laws to those of England.

He reiterated belief in consultation and co-operation of industry. He said American manufacturers should be able to go to the department of justice or the federal trade commission and ask for advice as to what they could or could not do,

(*Please turn to Page* 34)

Senator Guffey in the Picture

■ **Senator Joseph F. Guffey, Pennsylvania, gets his picture taken with Benjamin F. Fairless, center, president, United States Steel Corp., and Nathan D. Miller, right, the corporation's counsel, at the monopoly committee hearings. Acme photo**

National Founders Urge Business To Concentrate on Recovery Problems

NEW YORK

■ TREND of federal legislation, unemployment problems, industrial mobilization and the nature of possible war needs were among topics discussed here at the forty-third annual meeting of National Founders' association, Waldorf-Astoria hotel, Nov. 15-16.

Europe's war ultimately will work to the disadvantage of American business and industry, declared Franklin R. Hoadley, Atwood Machine Co., Stonington, Conn., in his presidential address.

Since it is vital that the nation be in soundest possible shape to meet tomorrow's inevitable difficulties, he warned, management must not let its attention be diverted by war or the current industrial upturn from our economic and political problems. These are more pressing today, it was pointed out, than before hostilities broke out.

Cautioning foundrymen against over-expansion, Mr. Hoadley asserted millions of dollars were sunk in brick and mortar during the World war, when in many cases temporary construction would have served the purpose. "Expansion of plant or equipment should adapt itself to our regular lines of manufacture after the war is over or should be amortized over a very short period," he said.

"Labor Looking for War Boom"

Management must redouble its efforts in training mechanics to ameliorate the present scarcity of skilled labor. This he termed a vital necessity for national defense.

Congratulating business leaders upon their clear and unmistakable expressions of opposition to war, Mr. Hoadley stated this belies the demagogue who would again seek to blame industry for war.

"Labor leaders exert considerable authority in Washington and often it is ruthlessly employed. They are not only able to procure passage of one-sided labor legislation," he said, "but they are also able to prevent modification of notoriously bad-working labor laws."

Labor leadership, of the ruthless type, Mr. Hoadley believes, undoubtedly is looking to a war boom to give it the opportunity to extend the closed shop to the steel and automobile industries. "If a war boom makes it possible to close up these important industries, and the administration fails to interfere, we might see the beginning of a serious price inflation period, which would not only cripple industry's ability to produce but might, if carried far enough, injure the credit of the United States government."

Whether there is a war boom here or just a continuance of the present domestic upturn, business must be prepared for a showdown with that element of labor which seems determined to use its temporary power to extend control over management, he asserted.

Indications are seen by Mr. Hoadley that the intent in Washington, in case America is again called upon to mobilize its war resources, is to use the emergency as a means of establishing permanently a degree of control over business not contemplated during the last war. "This program has been frustrated by the last two sessions of congress, but there are signs it will be pushed again with more vigor than ever. Should such a program come to pass the American businessman will really have something to worry about."

William D. Hamerstadt
Elected president, National Founders' association

Repeal of the national labor relations act was urged by Commissioner A. E. McClintock as essential to improvement of industrial relationships. He regarded the law as fundamentally unsound and impracticable.

"There is constant talk," Mr. McClintock said, "about the right to strike, but no attention is given the most important right—the right to work. There is much acclaim about the workers' right to join a union, while nothing is said about their equal right not to join a union. Much is heard about the rights of the majority, nothing about the rights of the minority.

"If our legislators are sincere in their desire to bring industrial peace and to secure to each man the benefits of his labor, they will repeal this labor act which violates all principles of fair play, and declare it to be the government's policy that such rights are equal and will be equally protected and that no coercion from any source will be permitted."

As interpreted the act eliminates confidence between employer and employe, he continued. "Under the rulings of the board, management, from the president down, speaks to the employe at its peril on any matter pertaining to his work should it in the slightest manner be inferred that the matter could be settled without the intervention of an outsider."

Discussing unemployment from its long-range aspects, Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., outlined what he regarded the essential elements of a permanent policy for control of unemployment.

First, he said, is a federal employment service based on the present organization with its co-operating state boards. The service must be expanded and improved until it is in position to give current information as to existing unemployment, its nature and its location. This would be the basis for all relief work and all employment activities.

Noncompetitive Projects Advised

Another element, Mr. Flanders declared, must be a program covering innumerable separate projects on which men may be employed. He emphasized these should be definite jobs "with beginnings and ends" instead of in the form of blanket operations.

Third essential is that such work must be done as nearly as possible at normal wages and under normal conditions. The projects must also be noncompetitive with private business. He suggested the release of projects by an authorized board. Instead of making a lump sum appropriation to be spent under stress of political necessity, the release should be authorized by a board charged by congress to follow closely the pattern revealed in current figures of the employment service, Mr. Flanders stated.

He proposed "an intelligent and co-operative attitude on the part of business," it being important that the program be recognized as remedial and favorable to recovery. Finally, he stressed the need for complete reversal of the present relationship between government and business.

Sen. Millard E. Tydings, Maryland, pointed to changes which have taken place in government since founding of the nation and declared today

government reaches into so many fields its actions are a matter of concern to everyone.

"In good years business has a way of setting something aside to be used in poor times. Only because of savings from years of prosperity has it been possible for business to carry through the past nine years," he said. During the depression, according to Senator Tydings, industry spent 23 billions of dollars more than it received thus making a bigger contribution to preservation of the country than the government.

"Government cannot forever continue to experiment, especially when in experimenting it eats up its substance." Pointing out this is the opportune time for the country to determine which experiments must be modified or eliminated, he called attention to the tremendous increase in the public debt, now up to 45 billion dollars.

While this is not disastrous, he said, spending cannot be continued at its present pace. Interest on the debt has become enormous, amounting to 17 cents on every tax dollar taken in. He emphasized that since this debt must be paid by the working men and women of America, not by the wealthy alone, it is high time for men to speak up in government, business and labor circles.

Industrial mobilization plans were outlined by Col. F. H. Miles Jr., commandant, Army Industrial college, Washington. Planning began shortly after the World war, has been carried forward ever since. Through years of active work in industry men have been thoroughly trained in plant problems, and know what to expect in the way of production needs in wartime.

Industrial mobilization planning has been subject to constructive criticism of business leaders since its inception. Declaring the war resources board had done an excellent job in reviewing the plans of the army and navy, Colonel Miles voiced his opinion there would be no attempt to regiment industry in event of war.

Lightplane Production Increasing

Brig. Gen. Henry J. Reilly, O. R. C., was introduced by Tom S. Hammond, Whiting Corp., Harvey, Ill., former president of the association, as his commanding officer during the World war. General Reilly discussed European military requirements. An observer of much of the fighting in Spain, he said one conclusion drawn from European military operations is that airplanes and tanks simply add two more essentials to modern warfare, but do not replace any equipment previously required.

While the war means a boost for aviation, the great background of the aircraft industry is commercial production, said William B. Stout, president, Stout Engineering Laboratories Inc., Dearborn, Mich., in his luncheon address on Wednesday. A great revival of student and private flying has resulted in the sale of nearly 3000 lightplanes already this past year, selling under $3000 each. He estimated 6000 of these planes will be sold in 1940, 12,000 to 15,000 the following year.

John C. Gall, counsel, American Association of Manufacturers, declared one trend in legislation was from negative to positive action. Instead of now serving as an umpire in its regulations, government has gone into the business of planned economy through which it tells the majority what to do.

Another shift has been in what he called a change from external to internal regulations, and still another, a change from direct to indirect regulation and coercion. By this latter, control not specifically permitted under existing statutes has been obtained through various forms of taxes, senate committee investigations, etc.

Government Symbolism Effective

Government, Mr. Gall stated, has gained a distinct jump on business by the use of more effective catch words and symbols. This has enabled politicians to sell a poor product bearing a good label, while business, with a better product, has been unable to get public acceptance.

He cited "social security" as taking first rank as a vote getting symbol. He said that he had no quarrel with the humanitarian objectives of this program, but that "it is a fact that it was sold by methods which, if employed by private industry in the sale of products, would have brought down upon it the federal trade commission, the department of justice, and no doubt a special senate investigating committee."

" 'Living wage' is a perfectly respectable term," he said. "But under the guise of guaranteeing workers against exploitation and abolishing 'sweat shops' we have now embarked upon a system of governmental wage and hour fixation—not merely regulation—which has no relation to the original social concept or the declared purpose."

In a paper on "Powdered Metallurgy," presented Thursday morning, Gregory J. Comstock, metallurgical consultant, New York, first reviewed the history of metal powder manipulations. He stated that the art is not new, but originated early in the nineteenth century in connection with processing platinum. The speaker presented skeleton descriptions of powdered processes employed in the production of platinum, tungsten, molybdenum, tantalum contact materials, porous metal bearings and the hard cemented carbides.

Mr. Comstock discussed the more recent applications of metal powder molding, such as the production of alnicol magnets and nonporous powder parts. He described the various factors relating to the production of oil pump gears pressed from metal powders.

In answer to a question as to sources of materials, he stated that most of the powdered iron now being used comes from Sweden, where the large production of sponge iron permits the manufacture of powdered iron on an economical basis. He stated that the price of Swedish powdered iron has been as low as 7 cents per pound. Savings involved in the process of powdered metallurgy is a function of the machining required on the part formerly used, since the use of pressed metal powders eliminates machining.

Eugene J. Benge, management engineer, Chicago, discussed application of job evaluation to the foundry industry. He stated evaluation aims primarily to get company jobs in correct alignment one with another. The first step is to analyze existing jobs according to such factors as responsibility, working conditions, hazards, physical effort, skill and requirements as to age, education and experience. These factors then are evaluated by comparison with a predetermined scale and the individual values totaled for each distinct job. Totals then are translated into dollars and cents.

William D. Hamerstadt, Rockwood Mfg. Co., Indianapolis, was elected president of the association. D. C. Bakewell, Blaw-Knox Co., Pittsburgh, was named vice president, and J. M. Taylor, Chicago, was re-elected secretary-treasurer. Mr. McClintock was reappointed commissioner.

Illuminating Co. Awards Equipment Contracts

■ Cleveland Electric Illuminating Co. has awarded contracts for heavy equipment to be installed in a power plant being constructed in Cleveland at a total cost of $6,300,000, scheduled for completion early in 1941.

General Electric Co. was awarded a 60,000 kilowatt turbogenerator; Worthington Pump & Machinery Corp. will supply condensers; Link-Belt Co., intake screens; Babcock & Wilcox Co., boilers; Pittsburgh Piping & Equipment Co., pipes, valves; Combustion Engineering Co., pulverized fuel equipment; and the Research Co., precipitators.

American Bridge Co. recently was awarded the contract for 5000 tons of structural steel for the project, as reported in STEEL, Nov. 13, p. 93.

Wider Use of Porcelain Enameled Steel Noted in Architectural Field

■ PROGRESS in the promotion of porcelain enamel and a continued broadening of use of this material was indicated by speakers at the ninth annual meeting of the Porcelain Enamel institute in New York, Nov. 16-17. The program fell under four major classifications—sales promotion, development problems, labor problems, and color and design—with reports of the market research and technical research sections of the institute coming in for careful review.

The market research committee proposed, as the first of three surveys to be conducted during 1940, a canvass of new developments in architectural usage of porcelain.

The technical research section, reporting activities at the national bureau of standards, said that the enamel section has underway and plans to continue in 1940 a program dealing with development of abrasion tests, under which come service abrasion, ball gouge, and needle scratch tests; color standards tests; and standard acid test revision. The tentative surface abrasion standard, published a year ago, is now being considered by the standards committee for adoption as a permanent standard, it was revealed.

Will Revise Standard

Work on the ball gouge test and the needle scratch test has been under way for about a year and will soon be ready for the usual preliminary check test in co-operating laboratories. A start has been made on the color standards test, but it was said that no estimate can be made of the time required for its completion. The standard acid test, while satisfactory under laboratory conditions for development or umpire purposes, has not found application for finished products. The test, therefore, will be reopened, it was stated, for revision by the standards committee, with representatives of the interested manufacturers invited to co-operate.

P. B. McBride, Porcelain Metals Corp., Louisville, Ky., was elected president of the institute to succeed F. E. Hodek Jr., General Porcelain Enameling & Mfg. Co., Chicago.

William H. Brett, Enamel Products Co., Cleveland, and R. R. Danielson, Metal & Thermit Corp., Carteret, N. J., were named vice presidents. William Hogenson, Chicago Vitreous Enamel Product Co., Cicero, Ill., was re-elected treasurer; and Charles S. Pearce, 612 North Michigan avenue, Chicago, was re-elected secretary and named managing director.

Considerable growth in use of porcelain enamel in the architectural field was anticipated by L. A. Estes, manager, commercial division, Carnegie-Illinois Steel Corp., Pittsburgh. Porcelain enamel roofing tiles, he thought, would find wide application not only for commercial, but also for residential use. Prices may be relatively high at present, but volume production should bring them down, he believed.

New Uses for Porcelain Enamel

The speaker spoke of a housing development near Pittsburgh, where porcelain enamel shutters have added permanent attraction to the houses. Porcelain enamel also has been used on exterior trim, porch hoods, interior bathroom panels, tubs, lavatories and sinks. He cited this as an example of what is already being done in the residential field.

He believed remodeling of the older downtown buildings in cities, large and small, offers tremendous opportunities for the application of porcelain enamel steel in the architectural field. However, standardization is needed to bring down costs, and aggressive merchandising to stimulate interest of architects, contractors and owners, he thought.

Distribution also is necessary, he said, to make products available to the building trade. He hoped the time would soon come when designs for kitchens and bathrooms would be accepted by architects and contractors generally, and when it would be possible for building supply dealers to carry porcelain enamel panels in cartons for delivery to the job when required—something not now being generally done.

When stock delivery and low costs can be combined, he said, there will be a wide market for porcelain enamel steel shingles, roofing tiles and other items for the architectural field.

Real progress is being made today in the production of porcelain enamel hot water tanks for domestic use, said the speaker, who also believed that there is an excellent opportunity for promotional work in the shipbuilding industry.

Quality of materials and permanence of finish are prime requisites for ships and if porcelain enamel interests can prove that the finishes of their material will stand the rigors of ocean voyages, they will find that moderate extra cost will not stand in the way of acceptance.

He remarked that the increase in number and variety of home appliances finished in porcelain enamel is of particular interest to steel producers, for it means an increasing amount of steel in the home. He also said that the steel producer viewpoint on porcelain enamel is the consumer viewpoint, for the sale of steel in this channel is dependent ultimately upon consumer acceptance.

The steel producer, according to Mr. Estes, has a vital interest in porcelain enamel, for it more than any other material commercially in use today clothes steel with lasting beauty and utility. He congratulated the industry on its efforts to improve quality, reduce cost and thereby open up new fields.

Declaring that many codes today restrain the use of porcelain enamel steel for certain types and classes of construction, B. L. Wood, consulting engineer, American Iron and Steel institute, New York, said it was important to have the proper provisions made for its use and that it was most helpful in obtaining this provision for the industry to have recognized standard specifications.

The speaker remarked in passing that there were 515 municipal codes, in which there were to his knowledge restraints on the use of iron and steel products with respect to applications to which they were well suited.

Outlines Requirements

He told the porcelain enamel people that they must be prepared to answer at least the following questions with respect to the use of their products in building construction: (1) Does the material itself meet structural, weatherproofing and fire protection requirements which are consistent with safety in the uses to which it is put; (2) what limitations, if any, should be placed on the size of the units to be used; (3) what are the proper materials or constructions to which these units should be attached; (4) what is the proper method of attachment; (5) how are the joints to be weatherproofed to keep out moisture; (6) what weatherproofing of supporting members is necessary; and (7) what degree of fire protection will be provided by walls constructed as proposed?

■ Spring meeting of the Electrochemical society has been set for April 24-27 at Galen Hall, Wernersville, Pa.

C. H. Elliott, Republic Operating Official, Dies

■ Charles H. Elliott, 61, since 1937 assistant vice president in charge of operations, Republic Steel Corp., Cleveland, died Nov. 16 of heart attack in Buffalo. Born in Wilmington, O., Mr. Elliott was educated at Wooster college, Wooster, O., and

C. H. Elliott

Purdue university. He was vice president of Trumbull Steel Co., Warren, O., at the time it was absorbed by Republic. In 1935 he was made manager of Republic's Youngstown-Warren district. Prior to joining Trumbull, Mr. Elliott was associated with Youngstown Sheet & Tube Co., Weirton Steel Co., and Jones & Laughlin Steel Corp., in executive capacities.

Organizer of Buffalo Union Furnace Co. Dead

Frank B. Baird, 86, a pioneer in the development of the pig iron industry, died Nov. 16 in Buffalo. Born in Marietta, O., Mr. Baird went to Buffalo 51 years ago. In the period 1889-1899 he organized the Tonawanda Iron & Steel Co., Buffalo Furnace Co., Union Iron Works, Buffalo Charcoal Iron Co., consolidating those firms in 1900 as the Buffalo Union Furnace Co., which was leased by M. A. Hanna Co., Cleveland. In recent years Mr. Baird had been active in many companies. He founded the Buffalo Pipe & Foundry Corp., in 1930, serving as president for several years. He was president of Canadian Furnace Co. Ltd. until it was sold in 1936.

Second Woodward Stack To Be Air Conditioned

■ Woodward Iron Co., Woodward, Ala., last week announced a contract for installation of air conditioning equipment at a second blast furnace. Company has been operating an air-conditioning unit at one stack since last summer. For comprehensive description of this unit see article beginning page 54.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Nov. 18	Change	Same week 1938	Same week 1937
Pittsburgh	94	None	52	36
Chicago	93	+ 2	60	27.5
Eastern Pa	87	+ 3	36	35
Youngstown	90	— 3	60	42
Wheeling	93	None	66	43
Cleveland	90	+ 2.5	79.5	15
Buffalo	93	+ 3	49	28
Birmingham	94	None	68	54
New England	100	+10	80	30
Cincinnati	88.5	+ 1.5	75	25
St. Louis	81	+ 4	51.5	15
Detroit	95	— 5	82	71
Average	93.5	+ 0.5	63	35

Foundry Equipment Orders Increase

■ Foundry equipment orders, shipments and unfilled orders in October showed substantial increase over September, according to the Foundry Equipment Manufacturers' association, Cleveland. Comparisons follow, indexes based on 1922-24:

	Oct. 1939	Sept. 1939	Oct. 1938
Net orders	220.4	184.4	87.9
Shipments	170.7	132.6	93.4
Unfilled orders	224.7	174.9	91.8
3 mos. av. gross orders	178.9	143.3	83.3

Young and Swope To Retire at Close of Year

■ Owen D. Young, chairman, and Gerard Swope, president, General Electric Co., Schenectady, N. Y., will retire from their positions Dec. 31, in line with the company's retirement policy. They will remain as directors and Mr. Young will be honorary chairman and Mr. Swope, honorary president. Their successors will be Philip D. Reed as chairman, and Charles E. Wilson as president. Mr. Reed has been with General Electric since 1926 when he joined its law department. He was appointed assistant to the president in December, 1937, prior to which he was general counsel for the company's lamp department. Mr. Wilson joined Sprague Electric Co., New York, in 1899, which later became a part of General Electric. Since December, 1937, he has been executive vice president.

PRODUCTION

OPERATING RATE UP HALF POINT TO 93.5 PER CENT

■ STEELWORKS operations last week rose ½-point to 93.5 per cent. Small increases were noted in seven districts, declines in two and three remained unchanged. A year ago the rate was 63 per cent; two years ago 35 per cent.

Youngstown, O. — Declined 3 points to 90 per cent as two large interests each took off one open hearth, leaving three bessemer and 68 open hearths active.

Chicago — After two weeks at 91 per cent operations rose 2 points to 93 per cent on gains by three mills. With two mills at theoretical capacity three others are over 100 per cent, one estimating its rate at 114 per cent.

Birmingham, Ala. — Unchanged at 94 per cent for the fourth week with 14 open hearths active here and 8 at Gadsden, Ala.

Detroit — Down 5 points to 95 per cent as one open hearth is off for repairs, to be relighted this week.

St. Louis — Up 4 points to 81 per cent, one open hearth being added by an East Side steelmaker.

Central eastern seaboard — Rose 3 points to 87 per cent on increased activity by two independents. Some tapering will occur this week when several open hearths will go down for repairs.

Buffalo — Regained 3 points to 93 per cent as one open hearth was relighted. The one idle furnace here is being repaired.

New England — Increased 10 points to 100 per cent, with all open hearths in production.

Cleveland — Rebounded 2.5 points to 90 per cent, following completion of open-hearth repairs.

Cincinnati — Recovered 1.5 points to 88.5 per cent, recent fluctuations reflecting furnace repairs.

Pittsburgh — Steady at 94 per cent, virtual capacity.

Wheeling — Continues at 93 per cent for seventh week, all available equipment being employed.

Disston To Expand Armor Plate Plant

■ Construction soon will be started by Henry Disston & Sons Inc. on a $250,000 addition to the firm's armor plate plant in Philadelphia. Adjacent to present facilities on Delaware river, the new unit will be 60 x 240 feet.

Equipment to be installed includes a quenching furnace, two annealing furnaces, handling and straightening machines.

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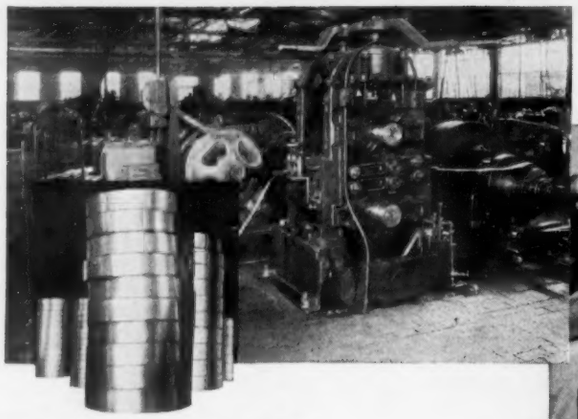

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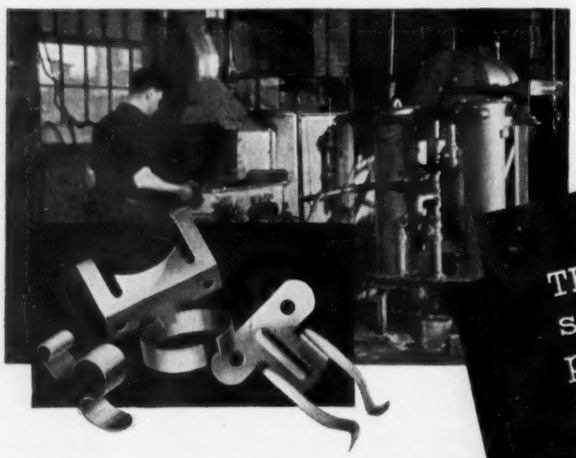

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Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ NAVAL expansion at cost of $1,300,000,000 is authorized in a bill ready to be introduced when congress reconvenes, it has been announced by Representative Vinson of Georgia, chairman of the house naval affairs committee. Hearings will begin Jan. 8.

Calling for construction of 95 new ships and purchase of 2400 aircraft, the program involves a 25 per cent increase in naval tonnage, 5 per cent more than provided by the "billion dollar act" of 1937.

No battleships would be built, but all other major vessel categories are included. Specifically: 3 aircraft carriers, 8 cruisers, 52 destroyers and 32 submarines. It is estimated this schedule will also entail need for 39 new auxiliary units of various types.

In addition to the proposed planes, legislation would provide for 36 lighter-than-air craft, most of them "blimps."

Vinson declared a survey of the shipbuilding industry indicated the bulk of construction could be completed in three to four years "if a special effort is exerted."

President Can Revise Program

Under the program, the President would have authority to alter building within the specified categories according to "the best interests of national defense."

To facilitate construction congress would be asked to repeal the provision in existing law requiring 50 per cent of all naval shipbuilding be done in navy yards, and to permit the secretary of navy to advance to contractors up to 30 per cent of the cost of any ship.

"The navy we have built, building and authorized will be protection against any single aggressor, but is insufficient for possible combinations," Vinson asserts. "In light of world conditions the American people require a naval force more adequate to meet any possible defense need."

HOPKINS PRAISES INDUSTRY'S ATTITUDE DURING UPTURN

Business activity gained substantially during October as production and distribution expanded to meet demand stimulated by the outbreak of war, Secretary of Commerce Hopkins said last week.

"Advance registered in October was even larger than September's," he pointed out. "However, the rate of increase prevailing at the end of October was considerably less than during early part of the month as the inflow of new orders moderated.

"One significant factor in the record of the past month was emergence of an attitude of caution among business men and an approach in statesmanlike manner to new problems arising from the war. Hostilities naturally brought many changes into the picture which business had to face. Danger of misjudging the future, resulting in undue speculative price increases and inventory accumulations, was precipitated and still exists.

"It now can be noted that business men are carefully appraising the outlook, analyzing all ramifications, before acting. This is a good sign."

Said the secretary concerning the steel industry: "Steel ingot production averaged almost 90 per cent of capacity in October as compared with the September rate of 71 per cent, and tonnage was slightly larger than in any previous month. Increased activity at mills resulted in heavy shipments of ore and coke. However, the rise in primary steel production has not been matched by similar gains in steel consumption, although the receipt of orders in durable goods industries has laid the basis for substantial production advances.

"Manufacturers of steel products such as boilers, fabricated plate and barrels have experienced substantial increases in business. Machinery manufacturers have received new business though in numerous instances this has been modest. Machine tool builders received an exceptional volume of orders in September and foundry equipment orders were also higher.

"Railway purchasing of equipment and rails advanced materially during September and October. The number of freight cars on order for Class I railroads increased to 23,000 on Oct. 1, more than at any time during the past 12 months, although still considerably below the first half of 1937. In addition to purchases of new equipment, railroads have enlarged working forces in their repair shops."

GOVERNMENT IRON, STEEL PURCHASES TOTAL $1,036,262

During the week ended Nov. 4 the government purchased $1,036,261.89 worth of iron and steel products under the Walsh-Healey act as follows: Midvale Co., Washington, $320,200; North & Judd Mfg. Co., New Britain, Conn., $12,143.03; United States Pipe & Foundry Co., Philadelphia, $33,454.22; Concrete Steel Co., New York, $25,184; Columbia Steel Co., San Francisco, $237,927.18; Colorado Fuel & Iron Corp., Denver, $58,632; Carnegie-Illinois Steel Corp., Washington, $12,701.80; Lindberg Engineering Co., Chicago, $39,968; Combustion Engineering Co. Inc., New York, $19,947; Phoenix Bridge Co., Phoenixville, Pa., $12,616; Goslin-Birmingham Mfg. Co. Inc., Birmingham, Ala., $128,000; National Forge & Ordnance Co., Washington, $45,425; Joseph T. Ryerson & Son Inc., Chicago, $10,848.96; Allis-Chalmers Mfg. Co., Milwaukee, $15,454; Timken-Roller Bearing Co., Canton, O., $10,319.31; Carnegie-Illinois Steel Corp., Boston, $18,845.04; National Tube Co., Pittsburgh, $12,705; and

Crucible Steel Co. of America, New York, $21,891.35.

TNEC Steel Hearings To Resume in January

(*Continued from Page* 27)

and not have to depend on the courts to decide whether they had violated a law or not.

Mr. Hook favors competition and published prices and stated that "it is in the public interest" for industry to file prices with its trade association. If prices were filed, said the witness, the manufacturers should be required to stick to their prices until another set is filed.

Automobile sheets, he remarked, have been sold as much as $8 under the published price. This was in answer to a committee member's question as to whether the announced prices are always lived up to. He said that it is not a good policy to deviate from the announced price and stated that sometimes the manufacturer himself is misled because of misinformation.

Mr. Hook told the committee that realizing a price and the posted price are certainly not one and the same thing. Some units of the industry he said will quote below the posted price. Committee members tried to get him to say to what extent the steel business is done on a base price basis. Generally, he said, steel business is conducted on a base price sale but he said he had no idea what the percentage would be. Some small mills, he said, are now selling well above the posted price.

The witness told the committee it is in the interest of industry to have price related to cost. During the closing minutes of his testimony, Mr. Hook told the committee he thought present price of sheets should be increased.

Charles H. Roberts, general sales manager, and F. H. Gibson, district sales manager at Pittsburgh, South Chester Tube Co., Chester, Pa., and O. I. Strickland, manager of the tubular sales division, and H. E. Schaefer, assistant sales manager of the tubular division of the Wheeling Steel Corp., were other witnesses before the committee last week.

Mr. Gibson related some pertinent facts about his company's pricing policy on tubular products sold in the oil country.

At the outset Mr. Feller told the probers South Chester Tube Co. was claiming immunity. George W. Whitney, general counsel for the company, said he questioned the way in which the committee had gone into the South Chester files and gotten out material, which he considered "illegal."

Mr. Roberts said about 80 per cent of tubular goods is sold to oil companies. South Chester, he said, does not manufacture steel but purchases skelp from integrated mills.

He said in many cases his raw material suppliers are in the same markets with finished tubular products. He was questioned as to what would happen to his firm if his supplier of raw material who is also his competitor for business would either reduce his price for the finished product or increase South Chester's price of raw material. Witness replied it would be hard on his company.

Mr. Roberts declared his company has no control over prices. He said the company just has to meet the competition. The product, he stated, is sold on a delivered price basis. The company's market, is in Midcontinent area and California.

Mr. Gibson was questioned on what department of justice officials called the Gulf river shipments. This was a letter from Mr. Gibson to Mr. Roberts in which Mr. Gibson told about purchases which the Gulf Oil Co. tried to make at barge siding. Gulf Oil, said the letter, tried to purchase seamless pipe f.o.b. barge siding from two pipe manufacturers. Mr. Gibson explained that pipe purchases are sold f.o.b. destination but the oil company tried to purchase f.o.b. barge siding. No manufacturer, he stated, quotes prices f.o.b. mill.

Witness said he had heard the National Tube Co. had refused to take the order insisting that the trade custom should prevail. He said the basis of the policy was the fact pipe must reach the consumer with threads in perfect condition and it was felt that as long as the manufacturer is responsible he should make the delivery through his own channels.

Mills Held Responsible

The situation for that reason, he pointed out, is different from any other steel product. If the purchasers were permitted to take the pipe at mills, the manufacturer still would be responsible for the material at destination. Then the manufacturer would have no recourse for damage in transit.

He testified tubular products work to a closer tolerance than most other steel products. Mills are held to task on delivery, the witness testified, for almost everything.

Mr. Gibson said the Gulf people had threatened to bring suit against "every pipe mill on the river" for restraint of trade. The sale at barge siding was never made nor were any suits entered.

Mr. Strickland testified Wheeling steel is integrated and he told the committee its products included standard pipe and oil country goods.

These witnesses told the committee that lapweld could only be sold when there was a sufficient price spread between it and its competitor, seamless pipe. Subsequent to a drop in the seamless pipe price in 1938, rumors arose that Wheeling intended to slash its price for lapweld, Mr. Roberts stated.

In letters between South Chester Tube officials, reference was made to objections on their part and on the part of other lapweld producers to the rumored slash in Wheeling's prices.

Mr. Strickland testified, however, that when the price list was published, it involved slashes in the "more popular" sizes—despite opposition of Wheeling's competitors.

Department of justice officials introduced for record a memorandum regarding product conditions from Mr. Gibson to Mr. Roberts, as follows:

Outlines Pipe Conditions

"The matter outlined below is in strict confidence and has been received by the writer, since return of the gentlemen from New York, whom we mentioned by telephone.

"Naturally, to gain the end which the other mills wanted, that is: Not to have the National Tube Co. quote prices on seamless material which would meet lapweld competition, it was very necessary for these other mills to give up something in return. Through the same and another source, we have today checked a second meeting of manufacturers other than the National Tube Co. to be held in a few days. As it stands at the moment, the thing resolves itself as follows:

"The National Tube Co. will leave as they are at the moment the prices for grade "B" seamless, which have already been announced. The National Tube Co. and all other seamless mills will discontinue the manufacture of new grade "C" and bring the physicals of the new grade "B" considerably higher. This with the new grade "D" will bring the status back to where it was prior to July 1, when the whole mess was started.

"Youngstown, Spang, Chalfant, Jones & Laughlin and Republic Steel will discontinue the manufacture of lapweld pipe in oil country sizes 10¾" O. D. and under.

"Wheeling Steel, who has already been contacted today, advised that with the present spread between grade "B" and lapweld, they were slowly being forced out of business and would only ask that they be allowed to dispose of present stocks of lapweld on hand.

"Bethlehem, who was contacted today, stated they had not made any lapweld oil country material since July 1. This I doubt, but they have also signified their intentions to dis-

(*Please turn to Page* 103)

AVIATION

AIRCRAFT BACKLOGS UP 48% TO RECORD $530,000,000

■ BACKLOG of the aircraft industry has increased 48 per cent during the past three weeks as result of huge military bookings, domestic and foreign. Unfilled aeronautical orders currently aggregate $530,000,000 as compared with some $150,000,000 at start of 1939. While export business already comprises half the present total, large additional awards from abroad are virtually certain.

Annual capacity of the industry on the basis of its present production facilities has reached 15,000 planes and still is moving up, declares John H. Jouett, president, Aeronautical Chamber of Commerce of America, Washington. This gives the United States greater potential aircraft output than is claimed by any other nation. Last year our production amounted to only 3700 units. Capacity for producing airplane engines, he estimated, now stands at 16,000 annually, while less than 6000 were turned out in 1938.

Advance in capacity is attributed by Mr. Jouett to expansion in plant area; new equipment; added working shifts; growth of sub-contracting; and approach to mass production through model standardization. Airplane plant area, he asserted, was expanded 17 per cent in the first six months this year from 6,000,000 square feet to 7,025,000, while engine factory space increased 20 per cent or 334,000 square feet.

Predicting the aeronautical business of Bendix Aviation Corp., South Bend, Ind., will increase from $16,000,000 this year to a possible $30,000,000 in 1940, the firm's directors recently authorized expenditure of $2,000,000 within the next eight months for new equipment to enlarge capacity of its aviation divisions.

Latest war department contracts for army air corps: Allison Engineering division of General Motors, Indianapolis, high-speed liquid-cooled engines, $1,851,631; Continental Motors Corp., Detroit, low-powered engines, $294,200; and Hamilton Standard Propellers division of United Aircraft Corp., East Hartford, Conn., propeller assemblies and control governors, $200,010.

Turning Out New Fuel Pump

Production of a new type fuel pump was started last week under a large air corps order at Thompson Products Inc.'s Cleveland plant. Developed by Thompson Products during the past year, the pump is soon to be produced under license by a British firm.

Speedy construction of steel hangars at nine air bases along the Atlantic coast for use of the inter-American "neutrality patrol" is planned by the navy. It is reported the department now is taking bids. War department is studying facilities at Patterson field, Dayton, O., with view to an expansion program involving: New engineering units, $690,000; engine test stand, $305,000; equipment repair building, $205,000; and general shop, $77,000.

Whether a railroad should be permitted to engage in air transport operations if it provides the requisite technical skill and as the law says is "fit, willing and able" to properly perform such service must be decided by civil aeronautics authority, now studying an application from Kansas City Southern railway. This carrier plans to buy new equipment, build a maintenance base at Shreveport, La., and operate between Kansas City, Kans., and New Orleans.

Already running trains, trucks and buses in this area, Kansas City Southern seeks to round out its service with an air arm. This is the first proposal on record for operation of an airline as wholly-owned subsidiary of a railroad, and if certificate is granted it augurs similar moves by other roads.

With traffic gaining steadily and safety records greatly improved, most airlines this year for the first time will maintain their summer schedules throughout the winter. In 10 months of 1939 the 16 major lines reporting to the Air Transport association flew 551,000,000 revenue passenger miles, almost 39 per cent ahead of the like period last year. Profits show corresponding improvement, aggregating an estimated $3,000,000 for 10 months.

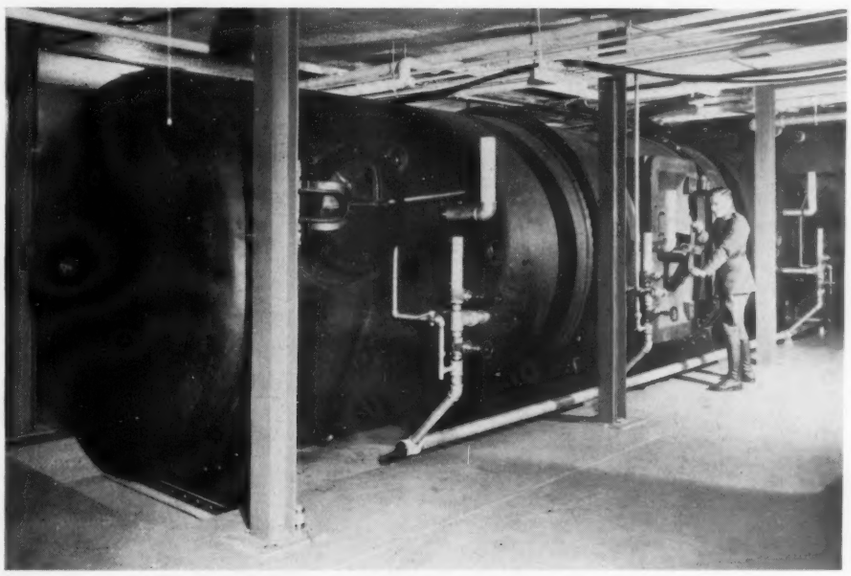
Arbitration Pact Signed

To enable the air transport industry to settle trade disputes and clarify contractual relations with minimum of delay and expensive litigation, leading airline executives last week signed an arbitration agreement. Its machinery will be administered by American Arbitration association's nationwide network of tribunals.

For its work "in developing processes for large-scale production of new aviation fuels and other synthetic chemical products" Standard Oil Development Co. will be presented the 1939 award for chemical engineering achievement offered by *Chemical and Metallurgical Engineering*. Award is to be made at the National Exposition of Chemical Industries, opening Dec. 4 in New York.

Plans for a flying torpedo controlled by radio, it was disclosed recently, have been submitted to the war department by American Television institute, Chicago. According to U. A. Sanabria, institute chief, the torpedo can be guided by a plane 100 miles away. It would travel 400 miles per hour, carrying enough high explosives to destroy a battleship.

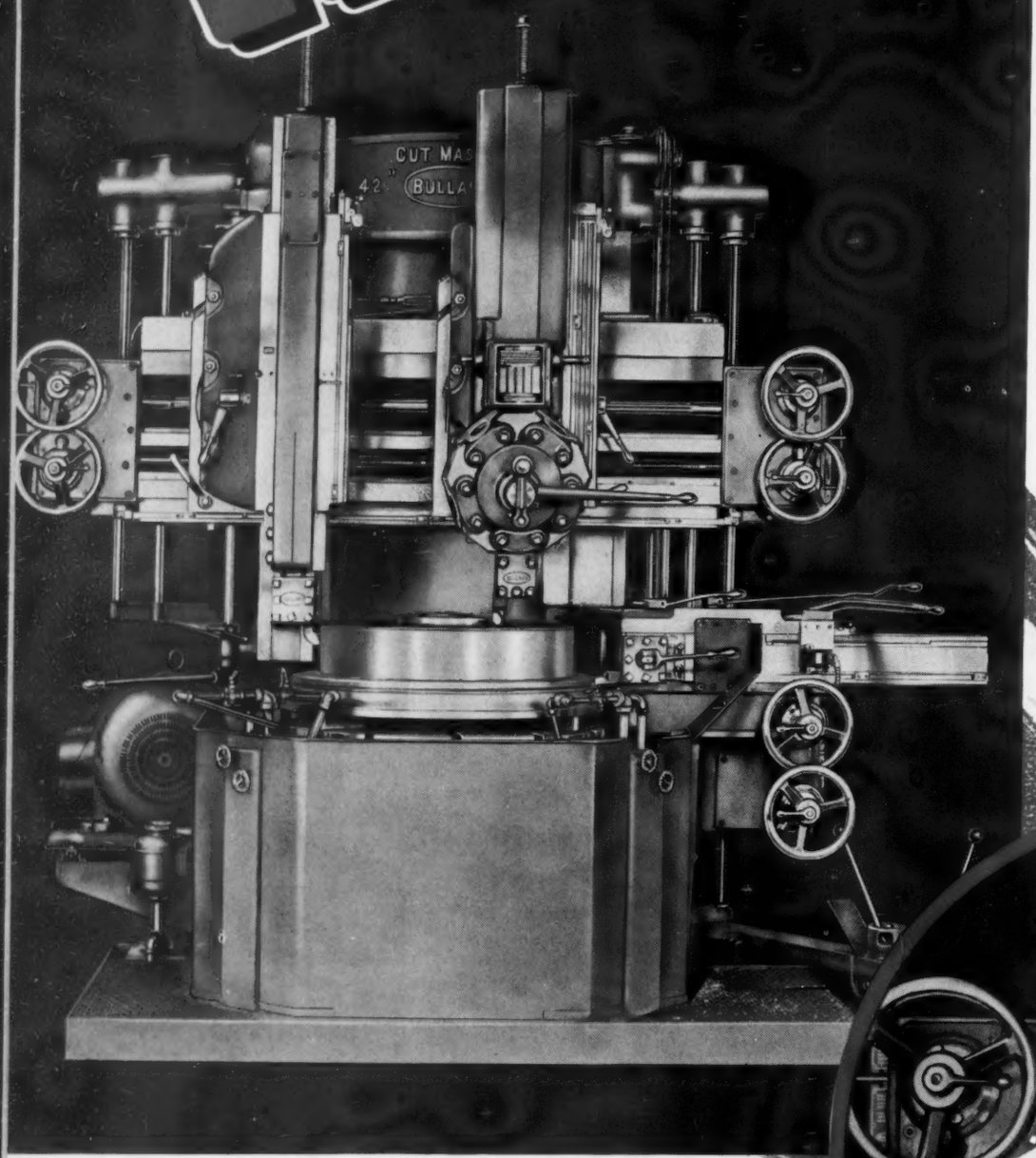
Simulating High Altitude Flight with Steel Tank

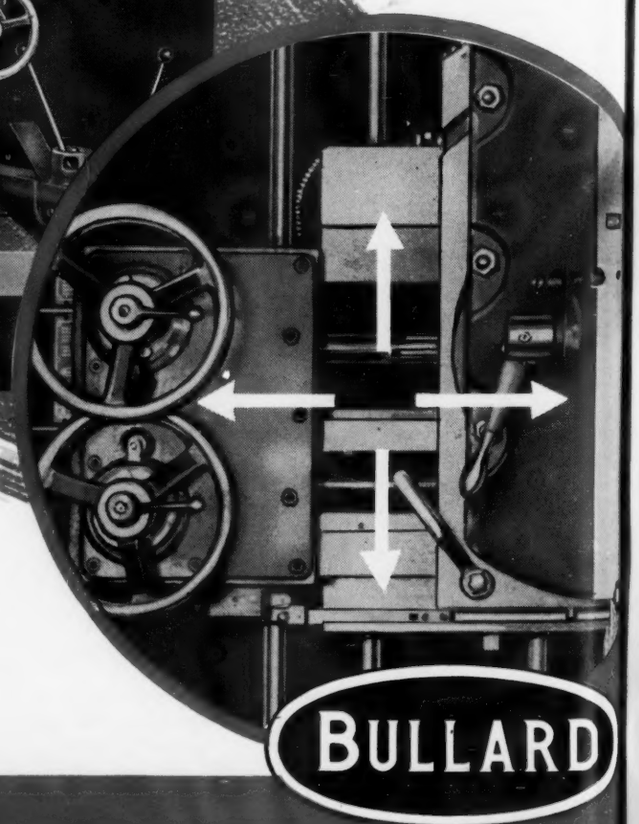


■ In this steel pressure chamber army's aero-medical researchers at Wright field, Dayton, O., study effects of high altitude upon pilots. Divided into three air locks, tank is 31 feet long, 8 feet in diameter. With electric pumps withdrawing air, "altitude" can be increased 12,000 feet per minute; at 40,000 feet external pressure on one end approximates 350 tons. Official photo, U. S. army air corps

CUT MASTER

VERTICAL TURRET LATHES





SMOOTH FEED—THREAD CUTTING ACCURACY

Cut Master Vertical Turret Lathes provide Screw Feeds of the rail heads in all directions.

Vertical Screw Feed is equipped with back lash adjustment to insure smooth, accurate feed at all times under all conditions.

Feed works are independent of each other which permit first and second threading operations simultaneously.

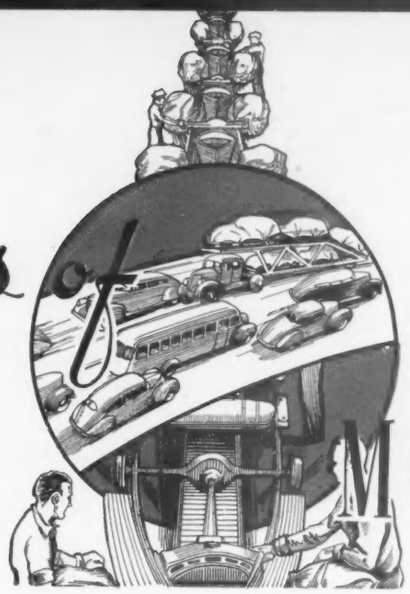
Smooth Screw Feed naturally insures thread accuracy and provides finer finish on all operations.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ DESPITE outward calm, this city last week was fast becoming jumpy and ill-tempered in the face of the longest-lived automobile strike on record. Subdued comment about "things" that were "going to happen" was general, and an undercurrent of discontent was apparent. It is impossible to keep 60,000 men out of work for six weeks, when there is work to be done, without straining patience to near the breaking point, and by midweek many thousands of tempers, and pocketbooks as well, were at that stage.

Scattered groups reported for work at some of the idle Chrysler plants, but the virtual sealing of the Dodge plant, a feeder for every other Chrysler plant, made it impossible to start any semblance of operations elsewhere. The UAW-CIO maintained a large picket line around the Dodge plant, and automobile loads of its flying squadrons were constantly making forays throughout the city to keep members in line.

Competitors Sympathetic

Though naturally there has been no open expression of appreciation to the Chrysler management for its firm stand in the present dispute with the UAW, other motormakers probably are tacitly lending moral support with the thought that, "There, but for the grace of God, go I." No obvious effort has been made by either Ford or General Motors to capitalize on Chrysler's misfortunes, although certainly a large number of buyers must have switched over to products of the former two because of inability to get delivery of a Plymouth, Dodge, De Soto or Chrysler. The sad part is that sales so lost will never be retrieved.

A body blow to the UAW-CIO was the recent denial of unemployment compensation benefits to the thousands now out of work by the Michigan unemployment compensation commission in a decision handed down Nov. 10. The 3 to 1 decision is being appealed by the union; meanwhile the only benefits open to idle workmen are the WPA or charity. Last week the UAW ordered its members not to apply for WPA jobs.

Workers Restrained by Fear

That there is growing animosity toward officials of the union from many rank and file workmen is no secret. However, they are restrained from action by fear of violence and intimidation by the union. These people may even constitute a majority of the workmen now idle, but they are unorganized and voiceless in the face of a militant and brutal minority. As one example out of probably hundreds occurring daily, the manager of a local machinery sales office was approached last week by two former machine operators at the Dodge plant. They declared in no uncertain terms that they were "fed up with the present situation" and asked for help in locating new jobs.

As an outgrowth of this disastrous strike may come some realignment of Chrysler plants in Detroit and out of the state. The Dodge plant here is and has been for some time the key plant to all other operations. So many vital parts are manufactured in this "feeder" that once it is shut down, all other divisions must be closed in short order. It may well be that the Chrysler management, looking to the future, will decide to reallocate some of the Dodge production to other areas to prevent a recurrence of the present tieup.

General Motors was faced with a similar situation in Toledo, O., several years ago when a labor dispute tied up Chevrolet transmission production there and forced assembly plants to scale down operations. Later, transmission production was spread to other centers and a repetition of choking this bottleneck is unlikely.

Dodge plants have been a stronghold of unionism, too. Probably in no other division of the corporation has the UAW become so strongly entrenched, a strategy which has ably demonstrated its effect.

■ SUGGESTIVE at least of current thinking by automotive engineers is a recent patent assigned to Chrysler by Roger K. Lee, encompassing a new motor car design, involving tubular frame, radial engine and front wheel drive. Entire weight of the engine, clutch and transmission is carried by the front wheel suspension, thus permitting a lighter and more economically built frame since the frame structure does not directly oppose traction torque. Engine unit is maintained in static balance by connecting units and an unbalanced mounting. Shaft of the engine is at an angle of about 30 degrees from the horizontal.

Direction of application of both engine and traction torque reactions is so determined as to dissipate the energy by controlled movement of the engine unit about a single axis. Rubber mountings are used to provide resiliency and absorb vibration. Engine, clutch and transmission are detachable from the body and may be removed on the road wheels, similar to the way in which the engine, transmission and rear axle assembly may be removed in the new delivery truck being built by White Motor Co.

The Chrysler design appears to be suited ideally to a small, low-power

and light weight car which could be sold at a price well below what the "big three" now bring. It would be incorrect to infer, however, that granting of such a patent signifies any immediate intention of starting production on the design. Much would have to be done in the way of equipping plants and rearranging assembly lines before this would be possible.

These days, the average automobile company considers a patent as protection for the future—not to prevent future use of details covered in the patent but to forestall individuals bringing suit against the company and claiming rights to a design which might be built some years hence. The files of most motor companies are well filled with patents, the prime value of which is insurance against future lawsuits.

■ PUBLIC acceptance of the Buick 50 and 70 body styles, which introduce the new type of wider, lower and stronger construction, have outstripped earlier predictions of company officials and point the way to 1941 designs. Built in only two body styles, a coupe and a four-door sedan, these models bulk to nearly 50 per cent of Buick sales, with the 40, 60, 80 and 90 series making up the balance.

When the Super and Roadmaster models were introduced, Buick had no qualms about whether they would sell, but they were essentially "feelers" of the public style pulse. Overwhelming acceptance accorded them suggests they may forecast the body lines of all 1941 Buick models, which practically would dispense with the necessity for a 40 or 60 series and would narrow the Buick field down again to four series.

New Lincoln Zephyr continental cabriolet, not yet on the market, is said to be an eye-stopper. Low rakish lines are accentuated by a hood which is 7 inches longer than on conventional models and a body which has been lowered 3 inches. Priced at around $3000, a model is now getting into production and should be on the streets around Jan. 1.

■ THREE new products, two of which have yet to appear on the market, testify to the nimble brains of designers in totally unrelated fields. One is an acorn nut, of conventional outward appearance, but produced at only a fraction of the cost of such nuts made by conventional methods. A common hexagon nut is machined with a small collar on one side which is slightly undercut. The acorn cap is pressed out of light-gage material, around 0.030-inch, and then swaged over the collar on the nut, forming a tight seal and giving appreciably more room for a protruding bolt in the capped portion than in other types of nuts. Manufactured by a local plating company, the product is meeting with rapidly mounting approval by users.

The second product is an automobile seat cushion which, instead of the usual mass of upholstery, padding, springs and rubber, is nothing more than a suitably-shaped rubber bladder inflated with about ½-pound of air, overlayed with the usual upholstery and trim. One of the leading rubber companies is reported to be initiating manufacture of this item.

The third development may have been suggested by the popular electrical phenomenon or stunt of frying an egg on ice by means of induction heating. It is a domestic stove assembled with plastic panels over a steel frame and arranged electrically so that utensils on the top are heated inductively, no heat going into the stove proper.

■ EQUIPMENT buying for the Ford aircraft engine project in France has been resumed in this city. Originally, the Rouge plant was making extensive inquiries for machinery and equipment to manufacture a Rolls-Royce aircraft engine in a Ford subsidiary plant in Paris. Some months ago, about 90 per cent of all purchases and inquiries was canceled, presumably because of Mr. Ford's distaste for any part of war business. Lately, however, an independent buying organization, a Michigan corporation incidentally known as Machinery Suppliers Inc., has been set up in a West Side plant here to handle purchases for this French engine project. An advance of $500,000 is reported in machinery circles as having been made by the French government to cover equipment purchases, most of which are on a basis of all or at least a good part cash on the line.

Two new plant projects in Michigan are rapidly taking form, one an automobile and aircraft parts plant in Holland, involving expenditure of about $500,000, and expected to be in production in 90 days; the other the Black River Foundry Co. in South Haven, involving expenditure of $350,000. Personnel has not been divulged as yet, both projects being handled through local chambers of commerce.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
9 mos.	3,954,480	1,642,520	2,570,161
Oct.	337,979	215,286	.....
Nov.	376,629	390,405	.....
Dec.	347,349	406,960	.....
Year	5,016,437	2,655,171	.....

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Oct. 21	70,114	59,860
Oct. 28	78,210	65,335
Nov. 4	82,690	75,830
Nov. 11	86,200	86,094
Nov. 18	86,700	96,735

†Comparable week.

	Week Ended Nov. 18	Nov. 11
General Motors	48,180	47,630
Chrysler	.....	.....
Ford	22,615	22,600
All others	15,905	15,970

*Revised.

Decatur Casting Co. To Hold Open House

■ Decatur Casting Co., Decatur, Ind., will hold open house at its plant Nov. 25. Employes and families have been invited to attend a private session during the morning; in the afternoon, employes' friends, engineers, designers, customers and the general public will be entertained.

Guests will inspect production facilities. Company's new continuous vertical core oven will be in operation and productive operations will be seen in various departments. Also to be displayed: Protective safety and health devices used in the plant; raw material; coremakers working equipment; finished castings.

Finished products in which Decatur castings are used will be exhibited by: S. F. Bowser & Co. Inc., Fort Wayne, Ind.; Delco Products division, General Motors Corp.; Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; Magnavox Co., Fort Wayne, Ind.; American Lawn Mower Co., Muncie, Ind.; Great States Corp., Shelbyville, Ind.; Sherman-Manson Mfg. Co., Chicago, and St. Marys, O.; and Warner Machine Products, Muncie, Ind.

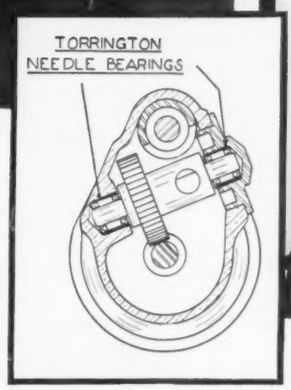
October Gear Sales Up

■ Gear sales for October were 11.2 per cent above September and 94.5 per cent ahead of October, 1938, according to American Gear Manufacturers' association, Wilkinsburg, Pa. First ten months this year show a gain of 32.1 per cent over comparable period in 1938. Association's index figure for October was 141, compared with 126 in September and 72.5 in October, 1938.

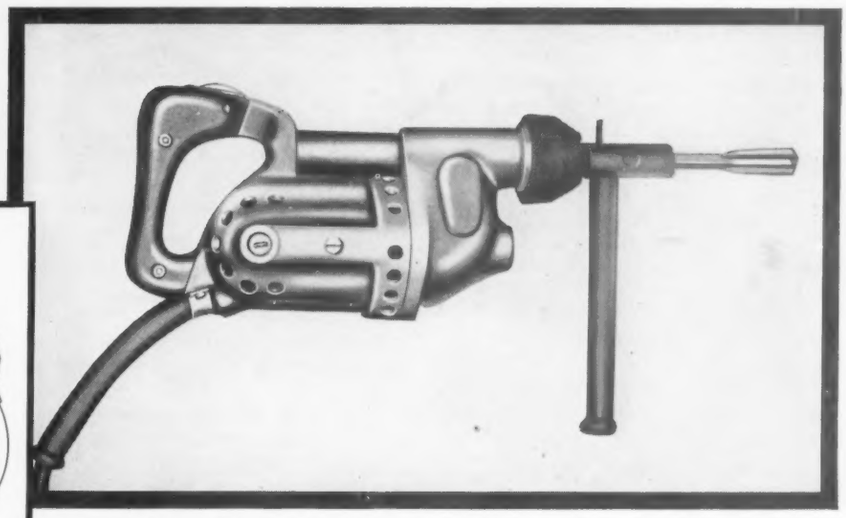
"WE GET BETTER LUBRICATION ON TOUGH JOBS WITH THE TORRINGTON NEEDLE BEARING"

SAY MAKERS OF WODACK ELECTRIC TOOLS

(*Above*) Wodack engineers designed the Wizard Electric Hammer for ruggedness, light weight and ability to run long periods without servicing



(*Right*) Cross-section showing how the Needle Bearings are mounted on the trip pin spindle.



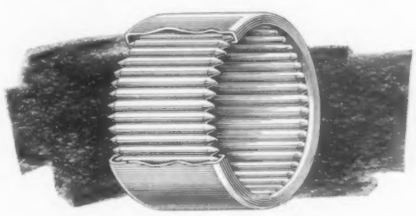
The light, high-speed Wizard Electric Hammer in which two sets of Torrington Needle Bearings transmitted 576,000,000 pounds of energy without additional lubrication—and with no signs of wear.

FOR their light-weight, hard-hitting Wizard Electric Hammer, engineers of the Wodack Electric Tool Corporation selected the Torrington Needle Bearing. In addition to small size and high unit capacity they secured a third important advantage—*better, longer lasting lubrication.* But read their own report . . .

"A stock Wizard Hammer was operated for 100 hours continuously day and night without additional lubrication on any of the working parts. Upon its disassembly, it was found that the bearings showed no signs of wear and appeared as good as new.

"The plunger strikes 2,400 times per minute, which is 144,000 times per hour. Therefore, in the 100-hour test, this part operated 14,400,000 times. At each actuation a blow of 40 pounds was struck, which totals 576,000,000 pounds of energy developed during this test period. *All of this energy passed through the two Torrington bearings, which are mounted on the trip pin spindle that operates the plunger.*

"Inasmuch as a certain amount of heat is developed during a test run of this nature, several of the parts were about to run out of lubrication. *However, the*



Torrington bearings with their unique characteristic of retaining lubricant were in very good condition." (Italics are ours).

And that is not all. The Needle Bearing is an inexpensive, easily-installed, compact unit that makes recognizable savings on assembly costs. Let the Torrington Engineering Department tell you more about this and perhaps suggest ways in which the Needle Bearing can give you exclusive advantages.

For further information write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Booklet 103X from our associate, the Bantam Bearings Corporation, South Bend, Ind.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings

New York Boston Philadelphia Detroit
Cleveland Chicago London, England

TORRINGTON
NEEDLE BEARING

MEN OF INDUSTRY

■ FRANK C. FARRELL has been promoted from assistant district manager, Central Alloy district of Republic Steel Corp., to district manager at Buffalo. Mr. Farrell will be succeeded by George W. Putnam, formerly assistant district manager at Warren. J. H. Graft, formerly superintendent, electrical department, Youngstown district, goes to Warren as assistant district manager, and J. M. Ashley, Mr. Graft's assistant at Youngstown, succeeds him as superintendent of the electrical department.

♦

Walter B. Wessels, formerly assistant treasurer, Porcelain Enamel & Mfg. Co., Baltimore, has been named secretary.

♦

Frank K. Chiles, heretofore assistant manager of sales in charge of bar division, Andrews Steel Co., Newport, Ky., has been named general sales manager.

♦

W. L. Fisher, formerly sales manager, Steel Storage File Co., Cleveland, has resigned to become president and sales manager, Transfer Files Inc., Cleveland.

♦

Harvey D. Stalnaker, Pittsburgh, who has been affiliated with the M. D. Friedman Co., Huntington, W. Va., scrap dealer, has resigned that connection to devote his entire time to his own firm, the Stalnaker Steel Co., Pittsburgh.

♦

Clayton P. Innes has been appointed representative in the Omaha, Nebr., territory by Cutler-Hammer Inc., Milwaukee. A graduate of South Dakota State college, Mr. Innes has had many years of field experience in the application of motors and motor control.

Clayton P. Innes

Frank C. Farrell

♦

James A. Pearse, formerly assistant purchasing agent, Reo Motor Car Co., Lansing, Mich., is now associated with the sales department of Ohio Steel & Supply Co., Cleveland.

♦

C. S. Finegan has joined the J. B. Beaird Corp., Shreveport, La., as assistant general manager. He formerly was with Ingalls Iron Works Co., Birmingham, Ala., as general sales manager and before that was with the Mobile Shipbuilding Co.

♦

V. H. Wallace has been named western sales manager, Caterpillar Tractor Co., Peoria, Ill., with headquarters in San Leandro, Calif. He succeeds the late H. H. Chambers. Mr. Wallace joined Caterpillar in 1927.

♦

I. C. Moreau has been named assistant to L. S. Wood, vice president in charge of engineering, Gar Wood Industries Inc., Detroit. Mr. Moreau's duties will be confined to engineering work in the company's hoist and body division.

♦

S. M. Tiffin has been appointed manager, St. Louis division, Federated Metals division, American Smelting & Refining Co., succeeding Dave Nassau, resigned. Arthur Fritschlee has been named executive sales manager at St. Louis.

♦

Prof. Albert E. White, director of the department of engineering research, University of Michigan, has been awarded a founder membership in the American Society for Metals. He is the fourth to be awarded this honor by the society.

♦

E. J. Kulas, president, Otis Steel Co., and Midland Steel Products Co., Cleveland, received the degree of Doctor of Commercial Science from Baldwin Wallace college, Berea, O., Oct. 28, at the dedication of the Musical Arts building, which he and Mrs. Kulas gave to the college.

♦

W. L. McGrath, vice president, Williamson Heater Co., Cincinnati, has been named president, Industrial Association of Cincinnati, to succeed George A. Seyler. Mr. McGrath is a past president, National Warm Air Heating and Air Conditioning association.

♦

Andrew F. Johnson, 86, mentor of many leading autobody designers, including three of the famous Fisher brothers, was the recipient of an honorary life membership in the Society of Automotive Engineers at a dinner in his honor in Detroit recently.

♦

George N. Tuttle has been appointed service representative in central Ohio for Porcelain Enamel & Mfg. Co., Baltimore. In recent years he has served as supervisor of the mill room and process control in the porcelain department, Frigidaire division, General Motors Corp.

♦

Harold S. Falk, vice president and works manager, Falk Corp., Milwaukee, has been appointed chairman of the Volunteer Effort for Wisconsin by Gov. Julius P. Heil. The appointment authorizes Mr. Falk to lay plans for a civilian recruiting effort in Wisconsin to be exerted in event of emergency.

♦

Irvin L. Clymer, since 1938 vice president, has been elected president, Michigan Limestone & Chemi-

Irvin L. Clymer

cal Co., Rogers City, Mich., United States Steel Corp. subsidiary. He succeeds John G. Munson, recently elected vice president, raw materials, United States Steel Corp. of Delaware. Joseph Penglase succeeds Mr. Clymer as vice president. Mr. Penglase, associated with the company 23 years, formerly was general superintendent.

♦

A. J. Wadhams, vice president, International Nickel Co. Inc., and manager, development and research division, has announced a recent change in the organization at the Bayonne, N. J., laboratory. The executive group now includes Dr. N. B. Pilling, director; Dr. W. A. Wesley, assistant director, E. M. Wise, staff advisor, and D. C. West, manager.

♦

Lester M. Goldsmith, chief engineer, Atlantic Refining Co., will be presented with the Melville medal

Lester M. Goldsmith

of the American Society of Mechanical Engineers at the annual meeting of the society in Philadelphia, Dec. 6, in recognition of his paper on "The High Pressure, High Temperature Turbine Electric Steam Ship the J. W. VAN DYKE."

♦

Edward Berkfield has been made vice president, American Steel Export Co., New York, in charge of the steel sales department. Mr. Berkfield, the past 11 years, was secretary, Steel Export Association of America and before that was associated for five years with United States Steel Products Co., now United States Steel Export Co.

♦

James L. Ashley, secretary and treasurer, International Nickel Co. of Canada Ltd., Copper Cliff, Ont., and an executive since formation of the original International Nickel company in 1902, has retired. He will continue to serve in an advisory capacity for several months, and remains a director of the company and its various subsidiaries.

William J. Hutchinson, who served as a director ten years and a member of the executive committee of the present Canadian company since 1928, and who resigned both offices in 1934, has been elected to succeed Mr. Ashley as treasurer, effective Jan. 1. He also has been elected a director to fill the vacancy caused by the resignation of William W. Mein, San Francisco, a director for 18 years.

Henry S. Wingate, assistant to the president, International Nickel Co. Inc., has been elected secretary of the parent company.

♦

Grover E. LeVeque, associated with the ore interests of Jones & Laughlin Steel Corp., since February, 1912, having served in various capacities until December, 1936, when he became assistant general superintendent, has been made general superintendent, Inter-State Iron Co. and Jones & Laughlin Ore Co., succeeding the late Mark Elliott. Headquarters will continue at Virginia, Minn.

♦

Posthumous award of the 1940 John Fritz gold medal to Dr. Clarence Floyd Hirshfeld, who until his death on April 19 of this year was chief of research, Detroit Edison Co., is announced by the John Fritz Medal Board of Award, New York. The medal went to Dr. Hirshfeld "for notable leadership through research and development in power generation and electric traction, and for being a great teacher and friend of men both young and old."

DIED:

■ RALPH STEWART MacPHERRAN, 68, who recently retired as chief chemist, Allis-Chalmers Mfg. Co., Milwaukee, after 44 years service, in Duluth, Minn., Nov. 13. He

R. S. MacPherran

was noted as a metallurgist in the field of gray cast iron, and especially for his co-operation in committee activities of several technical organizations. Mr. MacPherran received his technical education at the University of Wisconsin and the University of Michigan, graduating from the latter in 1892 with a degree in chemistry. In 1895 he joined the former E. P. Allis Co. In 1931 he was awarded the J. H. Whiting gold medal of the American Foundrymen's association. He was a member American Foundrymen's association, American Society for Testing Materials, International Society for Testing Materials, American Chemical society and American Society for Metals.

♦

Joseph Wilhelm, vice president, Acme Stamping & Mfg. Co., Pittsburgh, in that city, Oct. 23.

♦

Elmer E. Britney, 75, secretary-treasurer, Standard Castings Co., Cincinnati, in that city recently.

♦

Henry Schurck, 75, president and treasurer, Schurck Iron Works Inc., St. Louis, recently in that city.

♦

S. Porter Brown, 57, manager, George A. Fuller Construction Co., Boston, Nov. 1 in Springfield, Mass.

♦

Floyd G. Curfman, 59, vice president, Improved Equipment-Russell Engineering Corp., a division of Combustion Utilities Corp., New York, Nov. 5 at his home in Montclair, N. J.

♦

William J. Hanley, 72, commercial vice president, General Electric Co., Nov. 9 in Cleveland. Mr. Hanley began with the former Thomson-Houston Co. in 1888, and last year received a diamond medal in recognition of his 50 years service.

♦

Herbert W. DeBerg, 54, a sales representative of the United States Steel Corp. for many years, Nov. 3 at his home in Birmingham, Mich. In February, 1901, he joined American Sheet Steel Co. of New York, and continued when the firm became part of the American Sheet & Tin Plate Co. He went to Detroit in 1905.

♦

A. C. Hansen, 49, Nov. 12 while en route from Mineville, N. Y., to Pittsburgh. He was employed in the mines of Republic Steel Corp. at Bessemer, Mich., for a number of years, following which he was transferred to Negaunee, Mich., in 1919 as superintendent of Republic's Cambria mine. In 1937 when Republic acquired the Witherbee-Sherman iron ore properties at Mineville, N. Y., Mr. Hansen was transferred there as assistant manager.

Brassert Outlines European Experience with Low-Grade Ore

■ SMELTING of low-grade iron ores efficiently and economically is the chief problem facing iron and steel producers in Europe today. This fact was brought out by H. A. Brassert, president, H. A. Brassert & Co., 310 South Michigan avenue, Chicago, at the joint meeting of the Eastern States Blast Furnace and Coke Oven association and the Blast Furnace and Coke association of the Chicago district, at the University club, Cleveland, Nov. 10.

A record attendance of 230 heard Mr. Brassert describe the most recent blast furnace installations in Europe—the stacks at Corby, England, and those at the Hermann Goering Reichswerks at Braunschweig and at Lintz on the Danube river, Germany.

In discussing the iron-producing capacities of European countries, Mr. Brassert gave first place to Germany, although the two installations there have come a year too late. Neither of these plants will be at their maximum capacity for another two years.

Low Grade Ores In Germany

Only low-grade iron ores are available in Germany, these analyzing about 23 per cent silica and 28 per cent iron. Swedish ores of high iron content are brought into Germany over a canal system except during the winter months.

He pointed out that France has 5,000,000 tons of Minnette iron ore but has no high-grade coking coal. The ores of the Lorraine district contain 30 per cent iron in their natural state. To Russia he gave third place for her large ore deposits in South Russia and the Ural mountains. Italy makes her own coke but she has to import iron ores from India and the island of Elba. At present she has a blast furnace under construction in the harbor of Genoa.

The Baltic countries, on the other hand, have a plentiful supply of ore but no coal. Germany gets most of her ore from these countries. Jugoslavia has a high-grade ore but no coke and coal. That country is now trying artificial coke made from lignite. Holland has coke and coal, but no ore. Belgium has no iron ore and gets a poor grade of coke and coal from the Ruhr district.

Most English iron ore has a low iron content ranging from 22 to 32 per cent. New methods had to be devised to get a low silicon iron from the Northampton ore.

In describing the Corby plant in England, Mr. Brassert pointed out the plant had to be designed to take care of ore widely varying in chemical analysis. A sample analysis of that ore follows: Fe 29.8 per cent, SiO_2 7.9, Al_2O_3 7.6, MgO 1.0, and a varying sulphur content of about 1.0 per cent. The ore is powdery and weighs only 90 pounds a cubic foot. Ore also comes from surface mines having desposits about 50 feet thick. The top layer of earth is shattered by explosives and stripped by shovel.

Corby Works

The first Corby furnace was placed in operation in May, 1934, 14 months after breaking ground, the second unit in 1935. Mr. Brassert said the furnaces were built outside the town of Corby in order to preserve its medieval quaintness. This brought 1500 new houses and 15,000 workers to the town.

The furnaces are 50 per cent larger than others in England and have a capacity of 350,000 tons a year. Two machines sinter 1400 tons of ore daily. The furnaces are from 83 to 92 feet high and are cooled by vertical and horizontal plates set in the lining. Each stack is blown with eight tuyeres. Ratio of ore to coke is 3.3, wind to coke 56.4. Coke per ton of ore is 1985 pounds. Normal blast pressure is 11.7 pounds per square inch. Flue dust per ton iron amounts to 454 pounds. Hot blast temperature averages 750 degrees Fahr. Slag runs 1.25 tons per ton of iron.

Good control is exercised. Sulphur is reduced from 0.141 to 0.042 per cent by a process of desulphurization and phosphorus from 2.03 to 0.03-0.05 per cent. Sulphur in the metal going to the converter is 0.079 per cent, and after 24 hours, 0.042 per cent. Desulphurization is carried on at about 100 degrees Cent. higher than values accepted on the Continent. It was found that more than 35 per cent sinter in the burden is not economical, the maximum being 38 per cent, and the normal 30 per cent.

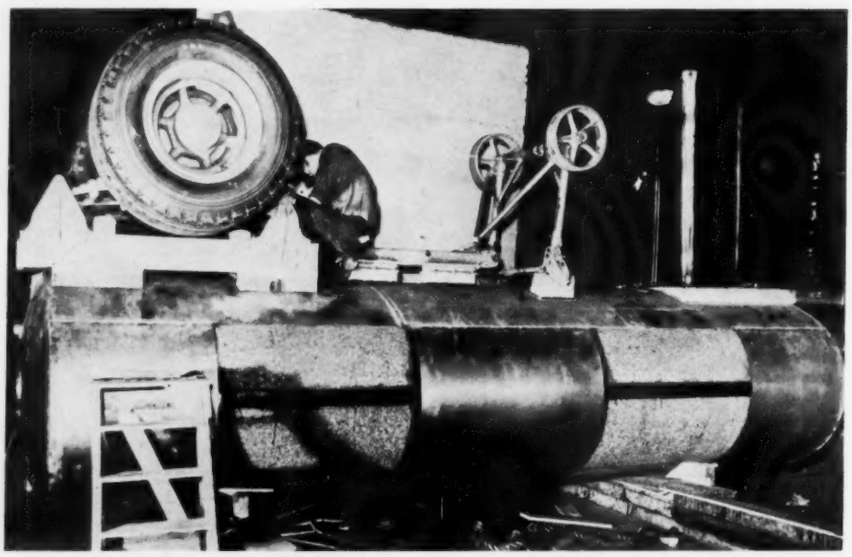
Corby iron analysis is as follows: Silicon 0.69, phosphorus 2.03, manganese 0.55, sulphur 0.125 per cent. Actual yield is 32.6 per cent. Slag analysis follows: Alumina 25.8, silica 32.3, lime 32.7, magnesia 5.02, sulphur 1.53 per cent.

Mr. Brassert emphasized that unless better beneficiation is effected, blast furnaces will not be able to take advantage of the higher temperatures and blast pressures placed at their disposal.

The Hermann Goering Reichwerks at Braunschweig, according to Mr. Brassert, occupies an area 5 miles long and 2 miles wide. It includes by-product coke ovens and four groups of eight blast furnaces. Plans call for the construction of six 60-ton converters and six 150-

(*Please turn to Page* 75)

Sheathing Stainless Steel Truck Tank



■ **Worker welds outer steel covering on a truck tank in Pfaudler Co.'s Rochester, N. Y., plant. The tank proper is made of 18-8 stainless steel, 10 or 12 gage, with a No. 4 polish on its inside surface. Corkboard, 2 inches thick, shaped to exact contour is attached by a special process to this shell, for insulation. The tank holds fluids, such as milk, at even temperature for considerable period**

Taxes on American Industry More Than Double Amount Paid in Common Dividends

A comprehensive study of 163 typical business corporations representing a cross-section of industry, and having 40½ billions of assets, 6½ million stockholders and 3 million employes.

Compiled and copyright by American Federation of Investors Inc., Chicago.
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[For fiscal year 1938]

Name of Company	Total Assets	Total Shares Outstanding (Com. & Pfd.)	Total Number Stockholders (Com. & Pfd.)	Number of Employes (1938 aver.)	1938 Total Taxes (All Kinds)	1938 Net Income (After Taxes)	Per Cent of Taxes to Net Earnings before Taxes	1938 Taxes per Common Share	1938 Dividends per Common Share	1938 Taxes per Common Stockholder	1938 Taxes per Employe
Acme Steel Company	$ 13,433,237	328,108	3,270	2,212	$ 346,313	$ 368,168	48.5	$1.06	$ 1.25	$ 106	$ 157
Allis-Chalmers Mfg. Co.	104,578,603	1,776,092	17,525	13,167	3,096,474	2,553,946	54.8	1.74	1.50	177	235
Amer. Brake Shoe & Foundry Co.	31,203,526	823,725	6,715	4,200	748,937	1,030,719	40.9	0.97	1.00	131	178
American Can Company	174,464,222	2,886,331	35,546	19,950	7,027,996	13,645,499	34.	2.84	4.00	238	352
American Cyanamid Co.	72,034,323	2,825,179	19,000	7,700	1,880,152	2,452,912	43.4	0.72	0.60	98**	244
American Locomotive Co.*	56,649,788	1,119,861	17,365	5,641	932,672	*(d)1,302,195*	—	1.21	None	90	165
Amer. Rolling Mill Co.	138,849,766	3,318,575	42,858	14,582	2,453,506	*(d)1,307,880*	214.2	0.86	None	74	168
Amer. Smelt. & Refin. Co.	164,108,100	2,691,669	28,119	28,734	6,600,000	10,611,809	38.3	3.01	2.25	322	230
American Tel. & Tel. Co.	5,119,062,915	18,686,794	646,882	257,443†	147,431,837	155,543,000	48.7	7.54	9.00	228	573
American Tobacco Company	276,663,968	5,083,174	60,614	20,091	129,669,012	25,435,643	83.6	28.46	5.00	2,466	6,454
Amer. Water Wks. & Elec. Co.	399,501,620	2,543,105	18,910	8,899	7,000,000	2,095,085	77.	2.99	None	495	787
Armstrong Cork Company	53,306,870	1,462,660	9,109	8,673†	1,105,595	1,150,796	49.	0.78	0.75	122	127
Atlantic Refining Co.	199,058,436	2,811,999	34,041	11,816	5,318,827[2]	4,317,297	55.2	2.00	1.00	181	450
Atlas Powder Company	24,617,729	317,760	4,464	2,225†	512,051	1,013,056	33.6	2.06	2.25	164	230
Baldwin Locomotive Works*	56,143,386	1,079,529	11,868	6,477	1,527,212	*(d)1,032,641*	308.8	1.49	None	139	236
Baltimore & Ohio R. R. Co.	1,190,120,713	3,151,585	39,930	33,442	10,717,048	*(d)13,124,530*	—	4.18	None	307	320
Beatrice Creamery Company	23,312,194	474,657	7,282	5,276	1,135,000	1,623,141	41.2	3.00	1.75	272	215
Belden Manufacturing Co.	3,233,700	241,547	996	922	93,621	*(d)101,711*	—	0.39	0.20	94	102
Bendix Aviation Corp.	33,790,480	2,097,663	23,193	7,752	1,092,208	156,048	87.5	0.52	None	47	141
Bethlehem Steel Corp.	699,474,044	5,051,758	74,358	82,680	13,183,148	5,250,239	71.5	4.14	None	278	159
Borden Company	122,400,608	4,396,704	47,668	27,500	6,577,060	6,641,205	49.8	1.50	1.40	138	239
Borg-Warner Corporation	43,191,920	2,302,040	16,800	9,500	1,700,686	*(d)19,966*	101.2	0.69	0.25	101	179
Brunswick-Balke-Collender Co.	13,657,213	473,606	2,353	2,234	614,127	1,003,710	38.	1.39	1.00	305	275
Bucyrus-Erie Company	26,245,216	1,277,235	10,461	2,169	428,767	677,953	38.7	0.35	None	47	198
Edward G. Budd Mfg. Co.	23,781,900	1,716,339	14,500	5,934	775,000	*(d)1,482,442*	—	0.47	None	61	131
Burroughs Add. Mach. Co.	36,018,645	5,000,000	16,915	10,462††	2,449,859	2,706,965	47.5	0.49	0.50	145	234
Butler Brothers	32,839,050	1,408,517	17,784	7,500	950,880	718,908	56.9	0.84	0.15	70	127
Case (J. I.) Company	43,579,878	296,785	3,310	7,439	1,472,712	2,422,372	37.8	7.55	5.00	755	198
Caterpillar Tractor Co.	52,738,636	1,997,392	17,911	9,432	1,851,446	3,235,709	36.4	0.98	2.00	112	196
Celanese Corp. of America	60,958,060	1,312,997	8,363	8,443	1,309,245	2,479,749	34.6	1.31	None	245	155
Certain-teed Prod. Corp.*	20,269,385	698,409	6,569	2,615	361,279	171,010	67.9	0.58	None	78	138
Chrysler Corporation	212,046,855	4,351,132	50,931	49,259	21,061,646	18,798,294	52.8	4.84	2.00	414	428
Cities Service Company*	1,080,068,703	4,635,739	622,000	24,000	17,940,158	5,814,515	75.5	4.84	None	35	748
City Ice & Fuel Company	44,859,678	1,353,899	13,061	4,000	1,703,515[3]	2,816,642	37.7	1.47	1.40	169	426
Colgate-Palmolive-Peet Co.	74,867,801	2,195,905	17,383	10,000	7,119,671	4,921,921	59.1	3.63	0.25	664	712
Columbia Gas & Elec. Corp.*	728,169,260	13,324,283	71,000	14,518	11,063,938	10,230,747	52.	0.91	None	187	762
Commercial Solvents Corp.*	21,255,955	2,636,878	29,024	1,120	15,892,689‡	*(d)294,358*	101.9	6.03	None	548	14,190
Condé Nast Publications	6,818,984	327,150	953	1,558	220,252	222,887	49.7	0.67	None	231	141
Consolidated Edison of N. Y.	1,358,558,488	13,656,838	123,542	38,378	51,353,569	34,893,619	59.5	4.48	2.00	536	1,338
Container Corp. of America	25,222,126	781,253	8,017	4,000	472,977	29,470	94.1	0.61	0.30	59	118
Continental Baking Corp.*	51,461,029	2,692,713	22,613	12,466†	3,065,168	4,493,803	40.6	1.34	None	191	246
Continental Can Company	123,327,938	3,053,971	37,422	14,931	3,362,545	7,101,973	32.1	1.18	2.00	97	225
Continental Motors Corp.	6,447,854	2,442,552	26,595	1,152	180,207	*(d)548,287*	—	0.07	None	7	156
Corn Products Refining Co.	113,227,947	2,780,000	19,843	4,473	2,938,285	9,753,669	23.2	1.16	3.00	172	657
Crane Company	105,522,308	2,541,431	11,975	16,400	2,602,982	380,698	87.2	1.11	None	288	159
Crown-Zellerbach Corp.	104,550,172	2,790,854	22,700	8,300	2,650,000[4]	6,211,414	29.9	1.17	0.75	189	319
Curtis Publishing Company	67,213,705	2,515,484	18,761	6,034	1,017,904	1,279,162	44.3	0.59	None	186	169
Cutler-Hammer, Inc.	7,929,120	659,998	2,717	2,970	303,939	*(d)307,438*	—	0.46	None	112	102
Deere & Company	107,931,155	4,547,362	9,836	14,102	4,954,995	9,469,931	34.4	1.65	1.35	1,109	351
Detroit Edison Company	348,934,035	1,272,260	14,697	6,553	7,687,596	7,833,306	49.5	6.04	6.00	523	1,173
Diamond Match Company	34,044,382	1,300,000	8,784	5,265	1,728,289	2,073,862	45.4	2.47	1.25§	259	328
Dixie-Vortex Company	6,467,629	381,310	3,457	990	253,358	734,998	25.6	1.42	1.00	123	256
Du Pont de Nemours & Co.	810,543,555	12,640,110	76,535	42,300	13,020,000	50,190,827	20.6	1.18	3.25	218	308
Eastman Kodak Company	177,061,899	2,312,578	38,851	23,800	7,228,000	17,339,408	29.4	3.21	6.00	193	304

Commercial Motors Corp.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	None	[illegible]	[illegible]
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Eastman Kodak Company	177,061,899	2,312,578	38,851	23,800	7,228,000	17,339,408	29.4	3.21	6.00	193	304
Federal Motor Truck Co.	3,683,199	491,543	3,082	387	98,232	*(d)299,269*	—	0.20	None	32	254
First National Stores	30,235,806	824,573	9,323	13,192	1,817,603	2,624,458	40.9	2.22	2.50	196	138
Food Machinery Corporation	13,269,155	466,676	3,512	1,368	373,221	840,537	30.7	0.88	1.375	140	273
General Electric Company	374,465,199	28,784,457	208,580	59,917	15,632,000	27,729,329	36.1	0.54	0.90	75	261
General Foods Corporation	89,020,025	5,401,440	69,245	10,578	4,693,294	13,577,075	25.6	0.89	2.00	70	444
General Mills, Inc.	60,557,410	888,111	10,063	7,100	1,935,000	4,110,631	32.	2.91	3.00	279	273
General Motors Corporation	1,598,012,229	44,697,925	389,509	163,972	73,812,000	102,310,036	41.9	1.72	1.50	200	450
General Theatres Equip. Corp.	12,258,207	597,887	5,790	885	239,000	507,267	32.	0.40	1.00	41	270
Gillette Safety Razor Co.	27,431,754	2,298,769	24,164	3,000@	1,895,038	2,941,889	39.2	0.95	0.70	96	632
B. F. Goodrich Company	132,008,377	1,715,286	26,480	20,000	7,300,000	2,240,119	76.5	5.60	None	362	365
Grant (W. T.) Company	41,181,727	1,538,212	4,429	17,597	3,389,291	2,766,424	55.1	2.85	1.65	833	193
Hat Corporation of America	6,998,915	499,375	2,130	2,600	273,060	325,888	45.6	0.58	0.20	163	105
Hercules Powder Company	46,992,039	1,412,904	6,680	5,137	1,332,930	3,089,017	30.1	1.01	1.50	312	259
Houdaille-Hershey Corp.	12,609,059	959,057	9,475	3,767	497,614	588,230	45.8	0.63	None	66	132
Hudson Motor Car Company	31,525,212	1,588,810	10,270	7,028	2,211,335	*(d)4,670,004*	—	1.39	None	215	315
Illinois Central Railroad Co.	740,133,655	1,544,452	18,545	27,362	9,708,123	1,222,874	88.8	7.15	None	651	355
Interlake Iron Corporation	56,641,247	2,000,000	7,142	1,691	462,836	*(d)1,021,655*	—	0.23	None	65	274
Jewel Tea Company, Inc.	10,347,804	280,000	4,553	3,690	1,100,415	1,423,959	43.6	3.93	5.00	242	298
Johns-Manville Corporation	51,056,564	925,000	7,752	9,838	1,474,664	1,455,302	50.3	1.73	0.50	190**	150
Kelsey-Hayes Wheel Company	15,976,612	548,267	3,776	2,455	456,105	*(d)1,045,504*	—	1.77	None	166	186
Kennecott Copper Corp.	342,768,309	10,821,653	79,417	24,400†	9,120,633	22,689,660	28.7	0.84	1.75	115	374
Kresge (S. S.) Company	124,925,991	5,489,922	23,273	30,300	6,982,938	8,997,051	43.7	1.27	1.20	300	230
Kress (S. H.) & Company	74,180,718	3,072,573	3,927	13,202	4,184,775‡	3,668,216	53.3	1.78	1.60	1,505	317
Kroger Groc. & Baking Co.	57,904,642	1,822,976	26,049	20,498†	12,170,955‡	3,741,569	76.5	6.68	1.90	468	594
Lehigh Valley Coal Corp.	33,068,123	1,432,846	13,945	7,662	1,517,665	*(d)1,509,958*	19,692.	1.26	None	142	198
Libbey-Owens-Ford Glass Co.	45,027,176	2,509,750	13,572	5,209	1,464,916	3,930,460	27.2	0.58	1.25	108	281
Libby-McNeill & Libby	56,904,890	2,557,685	12,593	11,868	1,289,779	*(d)3,354,277*	—	0.52	None	102**	109
Long-Bell Lumber Company	41,231,965	250,711	8,100	4,748	597,160	*(d)537,549*	1,001.8	3.02	None	75	126
Loose-Wiles Biscuit Company	28,302,119	560,710	6,066	9,135	1,176,604	988,074	54.4	2.26	1.05	225	129
Louisville & Nashville R. R. Co.	529,507,915	1,170,000	7,186	22,001	7,114,734	2,706,016	72.4	6.08	4.00	990	323
Masonite Corporation	5,919,281	557,629	2,550	1,700	450,535	1,144,274	28.3	0.84	1.50	215	265
McCall Corporation	16,402,643	528,760	4,340	2,009	362,045	561,842	39.2	0.68	1.00	83	180
McCrory Stores Corporation	22,661,965	1,040,253	2,584	9,000	1,279,839	1,765,063	42.	1.29	0.75	643	142
McLellan Stores Co.	8,373,389	763,181	2,618	6,000	441,784	860,788	33.9	0.60	0.60	197	74
Mesta Machine Company	14,503,244	987,979	6,390	2,435	1,171,999	2,909,957	28.7	1.19	2.50	183	481
Middle West Corporation*	448,226,233	3,308,355	34,500	8,313	8,299,552	2,678,463	75.6	2.51	None	241	998
Minneapolis-Honeywell Reg. Co.	11,016,668	652,600	4,067	2,592	569,081	1,003,289	36.2	0.92	2.00	171	220
Missouri Pacific R. R. Co.	680,722,978	1,546,396	8,260	22,214	5,835,450	*(d)14,767,960*	—	7.04	None	706**	263
Mohawk Carpet Mills	17,762,780	546,300	3,456	5,030	447,505	*(d)1,485,901*	—	0.82	0.25	129	89
Monsanto Chemical Co.	66,737,903	1,341,816	11,286	5,737	2,640,593‡	3,290,519	44.5	2.13	2.00	311	460
Montgomery Ward & Co.	227,830,990	5,418,701	61,452	43,000	9,155,000	19,644,956	31.8	1.75	1.50	153	213
Motor Wheel Corporation	12,455,440	850,000	8,500	2,510	404,145	621,780	39.4	0.48	0.40	48	161
Mullins Manufacturing Corp.	5,851,793	574,825	2,613	1,640	183,949	*(d)614,826*	—	0.34	None	96	112
Murray Corp. of America	17,302,655	950,615	9,000	5,732	781,396	*(d)1,495,700*	—	0.82	None	87	136
National Biscuit Company	124,985,701	6,537,493	54,680	18,347	6,066,471	12,047,038	33.5	0.96	1.60	123	331
National Cash Register Co.	47,943,580	1,628,000	18,925	6,781	2,640,000	2,392,341	52.5	1.62	1.00	139	389
National Dairy Prod. Corp.	199,724,676	6,353,956	75,349	35,911	8,035,529	11,326,360	41.5	1.28	1.00	109	224
National Gypsum Company	16,370,377	1,321,458	6,023	1,785	407,249	921,632	30.6	0.32	None	88	228
National Supply Company	67,463,371	1,726,156	7,044	6,241	1,492,042	1,283,767	53.8	1.29	None	514	239
National Tea Company	14,814,839	768,407	6,178	6,000	1,807,056‡	*(d)982,313*	219.1	2.90	None	325	301
Natomas Company	12,402,977	980,250	3,139	375	333,140	1,283,945	20.6	0.34	0.90	106	888
Neisner Brothers, Inc.	10,987,157	229,891	1,255	4,000	702,874	421,713	62.5	3.43	1.25	855	176
New York Central R. R. Co.	1,822,030,466	6,447,413	62,756	84,031	33,227,578	*(d)20,154,357*	254.2	5.15	None	529	395
Niagara Hudson Power Corp.	610,127,913	10,065,839	79,550	11,100	15,231,203	7,195,520	67.9	1.59	0.25	200	1,372
North American Company*	931,567,744	9,180,495	68,165	19,000	18,322,282	15,109,007	54.8	2.14	1.20	312	964
Ohio Oil Company	138,670,110	6,917,914	34,995	5,921	9,022,403‡	4,582,964	66.3	1.37	0.20	288	1,524
Otis Elevator Company	40,035,150	2,065,000	12,375	6,169	1,331,676	1,912,730	41.	0.67	0.60	117	216
Owens-Illinois Glass Co.	85,057,974	2,661,204	9,212	13,901†	2,333,626	5,383,805	30.2	0.88	1.50	253	168
Pacific Gas & Elec. Co.	764,251,466	11,632,092	95,985	12,575	17,081,167	23,430,289	42.2	2.75	2.00	475	1,358
Pacific Greyhound Lines	12,642,743	521,962	437	1,551	1,418,113	1,729,777	45.	3.38	2.25	3,245**	914

North American Company*	931,567,744	9,180,495	68,165	19,000	18,522,282	15,109,007	54.8	2.14	1.20	512	964
Ohio Oil Company	138,670,110	6,917,914	34,995	5,921	9,022,403‡	4,582,964	66.3	1.37	0.20	288	1,524
Otis Elevator Company	40,035,150	2,065,000	12,375	6,169	1,331,676	1,912,730	41.	0.67	0.60	117	216
Owens-Illinois Glass Co.	85,057,974	2,661,204	9,212	13,901†	2,333,626	5,383,805	30.2	0.88	1.50	253	168
Pacific Gas & Elec. Co.	764,251,466	11,632,092	95,985	12,575	17,081,167	23,430,289	42.2	2.75	2.00	475	1,358
Pacific Greyhound Lines	12,642,743	521,962	437	1,551	1,418,113	1,729,777	45.	3.38	2.25	3,245**	914
Packard Motor Car Co.	49,752,711	15,000,000	117,528	9,007	3,157,395	*(d)1,638,317*	—	0.21	None	27	351
Parker Rust-Proof Company	2,438,910	432,225	3,279	90	157,780	575,738	21.5	0.37	0.875	49	1,753
J. C. Penney Company	85,715,935	2,543,984	17,040	38,000	6,288,820[5]	13,739,160	31.4	2.47	4.25	369	166
Pennsylvania Railroad Co.	2,322,408,356	13,167,754	214,532	89,216	37,403,344	3,010,781	92.6	2.84	0.50	174	419
Phelps Dodge Corporation	194,226,766	5,071,260	17,334	10,150	4,041,000	8,656,824	31.8	0.80	1.00	233	398
Phoenix Hosiery Company	7,077,890	204,026	840	3,376	302,446	120,175	71.6	1.74	None	850	90
Pittsburgh Screw & Bolt Corp.	7,817,956	1,500,000	10,964	1,389	175,514	*(d)350,948*	—	0.12	None	16	126
Public Service Corp. of N. J.*	686,820,915	7,111,590	85,770	20,417	22,991,120	22,733,245	50.3	4.18	2.20	681	1,126
Pullman Incorporated	254,764,132	3,820,256	35,450	25,000	5,506,039	2,295,829	70.6	1.44	1.375	155	220
Pure Oil Company*	180,363,078	4,703,450[1]	40,000[1]	7,200[1]	31,956,203‡	5,412,903	85.5	8.03	None	1,102	4,438
Quaker Oats Company	60,206,714	882,000	7,645	4,072	1,503,628	5,852,895	20.4	2.14	6.00	393	369
Radio Corporation of America	90,799,549	14,795,554	245,895	18,046	4,154,024	7,412,072	35.9	0.30	0.20	18	230
Real Silk Hosiery Mills, Inc.	5,425,856	191,979	1,763	3,112	336,106	119,018	73.8	1.89	None	252	108
Republic Steel Corporation	348,715,525	6,234,757	59,045	42,073	5,548,309	*(d)7,997,825*	—	0.95	None	114	132
Ruberoid Company	15,593,759	397,806	1,230	2,500	354,131	515,472	40.7	0.89	0.60	288	142
Sears, Roebuck & Company	286,084,551	5,588,030	50,658	50,570	19,193,601	23,354,364	45.1	3.43	3.00	379	380
Frank G. Shattuck Company	20,931,219	1,257,500	7,000	7,000	1,000,000	536,960	65.1	0.80	0.50	143	143
W. A. Sheaffer Pen Company	3,896,125	160,591	2,370	1,110	242,655	691,112	26.	1.51	2.00	102	219
Shell Union Oil Corporation	399,399,214	13,411,725	20,266	25,547	77,316,796‡	11,318,423	87.2	5.92	0.70	4,445	3,026
Silver King Coalition Mines Co.	9,687,216	1,220,467	2,600	223	52,035	*(d)2,710*	105.5	0.04	0.10	20	233
Simmons Company	31,498,099	1,158,236	11,200	9,424	1,503,989	1,644,867	47.8	1.30	1.25	134	160
Socony-Vacuum Oil Company	923,438,918	31,206,071	113,240	56,429	116,475,818‡	40,106,917	74.4	3.73	0.50	1,029	2,064
Southern California Edison Co.	400,115,290	6,649,858	98,000	4,432	7,667,739	11,815,470	39.4	2.39	1.75	165	1,730
Spiegel, Incorporated	36,595,178	1,375,658	6,556	4,800	858,160	1,613,663	34.7	0.67	0.25	177	179
Standard Brands, Inc.	78,188,035	12,848,108	123,207	10,300	7,788,010	8,721,305	47.2	0.62	0.625	65	756
Standard Oil Co. of Ind.	724,663,142	15,272,020	99,665	29,928†	97,485,205‡	27,771,976	77.8	6.38	1.00	978	3,257
Stewart-Warner Corporation	17,812,336	1,241,847	17,176	4,195	908,116	*(d)294,323*	148.	0.73	None	53	216
Sun Oil Company	139,139,150	2,416,484	7,223	13,320	34,375,564‡	3,085,119	91.8	14.84	1.00	6,578	2,581
Swift & Company	306,454,521	5,919,750	59,000	60,000	8,281,937	*(d)3,493,978*	173.	1.40	1.20	14	14
Texas Corporation	605,360,644	10,876,882	86,380	30,717	104,357,013‡	23,139,030	81.9	9.59	2.00	1,208	3,397
Texas Gulf Sulphur Co.	61,097,347	3,840,000	30,741	850	2,771,000	6,963,633	28.5	0.72	2.00	90	3,260
Thermoid Company	5,400,000	515,800	4,100	700	129,000	20,000	86.6	0.27	None	35	184
Tide Water Assoc. Oil Co.	202,758,519	6,875,253	29,416	10,652	33,443,619‡	10,427,273	76.2	5.24	1.00	1,386	3,140
Timken-Detroit Axle Co.	15,863,537	1,006,077	9,882	2,485	603,000	828,035	42.1	0.61	0.50	65	243
Transcontinental & Western Air, Inc.	6,646,453	830,846	28,940	1,214	191,784	*(d)773,263*	—	0.23	None	7	158
Union Bag & Paper Corp.	19,373,390	1,052,274	2,667	3,713	511,921	903,892	36.2	0.49	0.125	192	138
Union Oil Co. of Calif.	165,993,365	4,666,270	26,524	9,580	16,109,450‡	6,862,758	70.1	3.45	1.20	607	1,682
Union Pacific Railroad	1,210,357,821	3,218,341	49,989	32,000	15,962,856	18,701,234	46.1	7.18	6.00	402	499
United Carbon Company	30,240,369	397,885	3,943	656	747,912	1,505,874	33.2	1.88	3.25	190	1,140
United Drug, Inc.	56,417,855	1,351,602	19,349	15,350	1,525,580	518,432	74.6	1.09	None	79	99
United Gas Imp. Co.	837,616,393	24,017,226[1]	127,974[1]	13,086	15,439,841	26,832,668	36.5	0.66	1.00[1]	144	1,180
United Light & Power Co.	577,069,460	4,076,768	18,746	13,135	11,232,388	3,091,506	78.4	3.23	None	974	855
United States Steel Corp.	1,711,279,006	12,306,063	219,727	202,108	48,842,131	*(d)7,717,454*	118.8	5.61	None	290	242
Western Union Tel. Co.	375,558,352	1,045,277	30,772	44,425	5,864,158	*(d)1,637,879*	138.8	5.61	None	191	132
Westinghouse Air Brake Co.	50,105,744	3,172,111	22,718	5,970	1,215,366	993,816	55.	0.39	1.01	53	204
Westinghouse Elec. & Mfg. Co.	207,560,215	2,672,129	44,418	42,402	7,095,787	9,052,774	43.9	2.73	2.50	167	167
F. W. Woolworth Company	229,614,592	9,703,610	58,427	46,500	12,287,133[6]	28,584,944	30.1	1.27	2.40	210	264
Young (L. A.) Spring & Wire Corp.	10,245,007	408,658	3,373	4,016	444,813	*(d)700,182*	—	1.09	None	132	111
Youngstown Sheet & Tube Co.	241,719,671	1,825,008	12,209	20,031	3,685,000	*(d)658,934*	121.8	2.20	None	371	184
TOTAL for 163 Companies	$40,379,197,744	649,744,071[7]	6,538,459[8]	2,854,382	$1,643,466,791	$1,022,725,608					
						AVERAGE PER COMPANY	61.6%	$2.73	$1.33	$283	$576

*Includes subsidiaries. †As of Dec. 31, 1938. ††Includes foreign employes. ‡Excise taxes included constitute considerable portion of total. (d) Deficit. **Per stockholder (com. & pfd.). §Plus $2.50 in securities. [1]For parent company only. [2]$24,194,468 excise taxes not included. [3]$2,364,289 Federal and State beverage tax not included. [4]Includes $427,700 Canadian taxes. [5]$3,258,443 excise taxes not included. [6]$3,344,693 excise taxes not included. [7]Includes 602,682,821 common shares. [8]Includes 5,806,244 common stockholders. @Approximate.

Steel Competition "Unrelenting" In All Phases, Declares Girdler

■ ONE DANGER of the European war is that its dramatic events will so absorb the American people's attention that their thoughts will be diverted from domestic problems, warned Tom M. Girdler, chairman, Republic Steel Corp., Cleveland, last week. Mr. Girdler spoke before approximately 400 industrialists at an Ohio "steelmakers dinner" sponsored by the Cleveland chamber of commerce.

"The war in Europe has affected our emotions and our economy temporarily. It has brought no permanent solution to any of our problems. They are with us today just as they were last August. It is time to give some thought to them."

Among outstanding domestic problems, Mr. Girdler mentioned: Government spending far in excess of income; large unemployment and relief problem; excessive tax burden on enterprise; a one-sided labor relations act; and a "state of mind which encourages the view that the country can have more by producing less."

Business improvement, Mr. Girdler declared, is not based entirely on the European war and recovery would continue even if peace were reached.

Recovery Based on Confidence

Recovery, he said, "has been underway since last spring. Chiefly it was based upon the accumulative requirements for many products and the growing confidence of private capital that the extreme left-wing schemes and designs of the New Deal were falling into popular disfavor. Such portion of the increase that is due purely to war causes, of course, would be wiped out by peace, but the ending of the war should not destroy the forces of recovery which were at work before the war started.

"What really is to be feared is the loss of that growing confidence for the future of private enterprise which was a large factor in business gains earlier in the year."

Mr. Girdler charged that for seven years there has been a concerted effort to cultivate in the minds of the people suspicion of industry and distrust of the profit system.

"Restraints and restrictions upon free enterprise have been imposed and numerous bureaus with broad powers for the control of business have been established. Among members of these bureaus and boards and commissions are some men who are distinguished only by their hostility toward industry and their contempt for the profit system.

"When laws are lacking to compel industry to fall into line with half-baked experiments in so-called 'economic planning' there is resort to threats, and so we have more than once seen in free America the spectacle of an attempt to govern by coercion and intimidation. . . .

"I sometimes think that business may deserve some of the contempt the left wingers feel for it. All too often representatives of business are afraid to stand up and fight for their simple rights. Fortunately, there are some signs that that tendency is on the decline."

Mr. Girdler said "industry cannot match the political demagogues in their utopian promises but it can prove it has a genuine, human regard for the material welfare of the people" and urged businessmen to take a more active interest in public affairs.

"Upon businessmen falls the obligation to defend free enterprise from further crippling restrictions. In defending free enterprise we are defending democracy."

Mr. Girdler defended the steel industry against charges it was monopolistic and noncompetitive.

"The fact is that for ten years the competitive struggle for business and for existence in the industry has been unrestricted and unrelenting in all its phases, including prices."

He expressed his opposition to excessive steel prices at any time, said at present it is especially important that prices be held in reasonable restraint, that there must be no runaway markets, nor any exploitation of Europe's war for profiteering purposes.

Favors Profits, Not Profiteering

"Because I do not believe in profiteering it does not follow that I am against fair prices which will permit the earning of a fair profit."

To meet the steel industry's basic requirements, Mr. Girdler thought prices that would permit earnings of at least 10 per cent on invested capital in years of large demand and high activity would be reasonable.

"Mark you, I do not say 10 per cent for every year, or for the average year, but for the occasional peak year, which would fortify the industry against the bad years."

In the past 20 years, he pointed out, the steel industry has come close to earning 10 per cent only once—in 1929 with a return of 9.1 per cent. Average annual net return for the past ten years has been only 2.5 per cent.

Mr. Girdler touched briefly on the recent circuit court of appeals' decision in Republic's labor board case, pointing out that the amount of back pay which might have to be paid by the company, even if on final appeal the Supreme Court upheld the board, would be only a fraction of the $7,500,000 mentioned in news comments.

Mr. Girdler was introduced by F. C. Crawford, president, Thompson Products Co., Cleveland, and president, Cleveland chamber of commerce.

MEETINGS

CONGRESS OF INDUSTRY SCHEDULED FOR DEC. 6-8

■ "A REPUBLIC FOREVER" will be the theme of the forty-fourth Congress of American Industry to be held at the Waldorf Astoria hotel, New York, Dec. 6-8, under sponsorship of the National Association of Manufacturers and the National Industrial council. The congress will be devoted to an analysis of the factors, including free enterprise and other liberties, which have contributed to political, social and economic progress.

Preceding it, executive officers of the 250 national, state and local industrial associations, comprising the National Industrial council, sponsored by the Manufacturers' association, will hold a two-day meeting beginning Dec. 4.

At the opening session Dec. 6, outstanding authorities will discuss "The American Concept." The afternoon session will be devoted to consideration of the "Accomplishments and Opportunities of Private Enterprise," followed by a panel discussion of the business outlook by three leading economists.

Other sessions will center on requirements for successful functioning of private enterprise, including capital investment, patents, taxes, governmental policies; the legislative outlook for 1940; and harmonious labor relations. The 1940 program for American industry will be adopted at the afternoon session, Dec. 7.

CHEMICAL INDUSTRIES SHOW TO BE LARGEST SINCE 1930

Seventeenth Exposition of Chemical Industries to be held in Grand Central Place, New York, Dec. 4-9, will be the largest since 1930, according to indications based on space thus far reserved. Nearly 300 exhibitors representing over 40 industries will display their products.

What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ PROCESS for manufacturing composite metals by carbon arc welding, which may make possible carbon steel with a stainless steel surface at cost not out of line with plain carbon steel, is attracting interest here. Patents on the process have been issued to Robert E. Kinkead, consulting welding engineer of Pittsburgh and Cleveland. United Engineering & Foundry Co. has acquired exclusive rights to manufacture machinery and equipment required in the new process, and one steel producer here already has been licensed to manufacture the composite metals.

According to Mr. Kinkead, the new product may find application in fields where tin plate and galvanized sheets and plates now are used.

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Safety Conference Series

A second safety conference was sponsored by the department of labor and industry of Pennsylvania and Pennsylvania State college, one of a newly-instituted monthly series. These one-day conferences will be held in various parts of the state, and will deal with practical ways to eliminate occupational disease hazards. Scheduled speakers are industrial men, and subjects cover almost every industrial hazard, the speaker usually outlining the procedure by which his company has been able to combat the problem.

Demonstrations of equipment and testing procedures are included whenever possible. Last week's meeting included tests used in the manufacture of safety helmets by Mine Safety Appliances Co. and use of an electrostatic dust sampler in sampling lead fumes, demonstrated by Westinghouse Electric & Mfg. Co.

Other subjects on the program included safe practices as used in the glass, chemical, foundry, fabricated steel, welding, viscose rayon and construction industries. The nine papers presented here, as well as papers presented at all future monthly sessions, are published in bulletin form. Copies are available from R. L. Houtz, department of labor and industry, Harrisburg, Pa.

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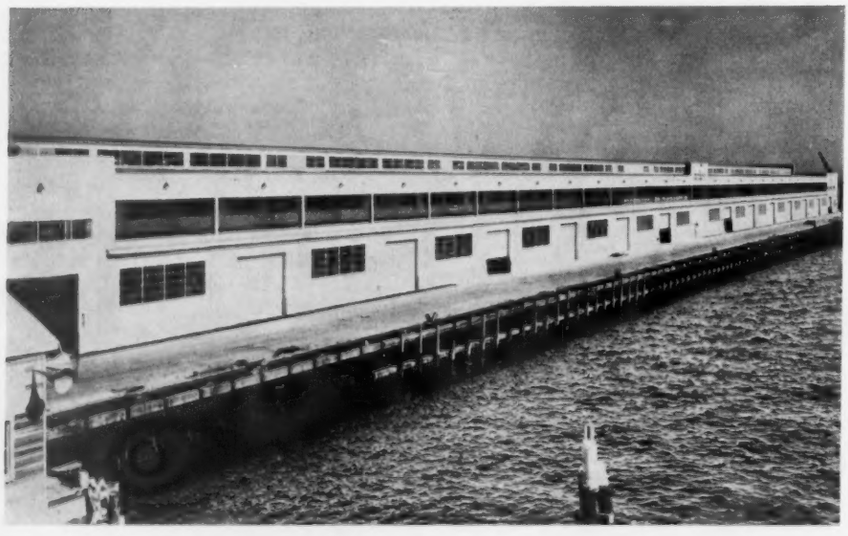
Completing Intercoastal Waterway

Steel shippers here soon will be able to barge their products as far as Corpus Christi, Tex., with the completion of the Louisiana-Texas Intercoastal Waterway. The last 200 miles of this unit are nearing completion, running from Houston to Corpus Christi. Majority of steel tonnage moving via this link is tubular goods for the oil fields. Total length of the waterway from Pittsburgh to Corpus Christi will be 2548 miles.

Huge Harbor Terminal of Sheet Steel



■ **Fifty-six tons of sheet metal were used in the Long Beach, Calif., harbor transit terminal. Costing $400,000, the warehouse has nearly three acres of floor space, enough to store cargoes of many ships. To resist corrosive action of salt air, American Rolling Mill Co.'s paint-grip sheets were used for cornices, coping, monitors, louvers and siding. These permitted painting as soon as sheets were installed**

Sees More Steel In Home Building

■ IMPROVED rolled steels and better finishing and coating processes are widening steel applications in residential construction, Bennett Chapple, vice president, American Rolling Mill Co., Middletown, O., told a group of architects in Cleveland last week.

Mr. Chapple cited the growing acceptance of standing seam steel roofing, once used only where appearance was unimportant, for homes. Recently developed steel sheets which can be painted at time of application are responsible. Shadows thrown by the standing seams enhance the beauty of roof colors.

Improved galvanized sheets, which will not flake when fabricated, provide an inexpensive and durable material for many miscellaneous applications for which other materials formerly were used. Air conditioning's popularity promises a fillip for this material.

Mr. Chapple believes steel staircases, such as installed in the Colonial Village homes, near Carnegie-Illinois Steel Corp.'s Irvin works, Clairton, Pa., will in time become almost universal. Wood staircases, he explained, are critical fire hazards, serving as natural chimneys.

Versatility Demonstrated

Porcelain enamel sheet steel holds great promise as architectural material, the speaker pointed out. Once considered structurally only for filling stations and similar buildings, several recent adaptions, including his company's new research building and a school building in Pennsylvania, have demonstrated the versatility and beauty of porcelain enameled steel.

Stainless steels also will find wider applications in residences where corrosion resistance is essential and appearance an important factor.

Mr. Chapple cautioned against impatience with the relatively slow popular acceptance of all-steel residential construction. Despite some obvious advantages, such as being fire and termite-proof, the layman cannot be expected to turn from conventional construction suddenly.

American Rolling Mill's steel housing development for its workers at Middletown was described. Mr. Chapple estimated the steel construction and insulation used resulted in a 50 per cent saving in heating costs and that the homes were about 15 per cent cooler during the summer.

Canada Speeds Industrialization; Some Plants Await Machine Tools

TORONTO, ONT.

■ CANADIAN iron and steel plants are maintaining the high operating schedules which went into effect immediately following the European war's outbreak. Primary producers are working at capacity while secondary plants are operating at about 70 per cent.

Companies that will produce guns, shells and other war materials have been rushing plant reconditioning. Some are awaiting delivery of machine tools to start war-time operations.

Officials at Ottawa have indicated no time will be lost in awarding large war contracts to Canadian and United States firms. To date, about $75,000,000 has been spent with Canadian companies, and this figure is growing daily.

British government has completed arrangements for co-ordinating war purchases in United States and Canada. Col. J. H. M. Greenly is chairman and controller-general of the British supply board in Canada and the United States. Board will place orders in Canada through the Canadian war supply board headed by Wallace Campbell.

Orders in the United States will be placed through a British purchasing commission headed by Arthur B. Purvis, Montreal, who has temporary offices at 25 Broadway, New York. It is reported here that $1,000,000,000 has been made available for purchases in the United States of airplanes, machine tools, raw materials and other items. More money is understood to be available on demand.

Limited by Foreign Exchange

United States purchases, it is said, may be limited by the amount of foreign exchange available, the extent to which Canada can provide raw materials and manufactured goods and the duration of the war. British authorities have indicated the government's policy will be to look first to Canada.

Colonel Greenly has announced there will be close co-ordination of all purchases in North America by the United Kingdom, and possibly by all the allies. While Colonel Greenly has not indicated the extent of purchases here, he has revealed the first purchases will include airplanes, munitions, antisubmarine boats, and barrels for antiaircraft guns. Canada will be asked to manufacture fuselages for aircraft, while engines will be produced in United States and England.

Colonel Greenly confirmed earlier reports Canadian shipyards will receive orders for antisubmarine vessels of the "whale catcher" and "mosquito" types. Orders for 20 for the Canadian government and ten for the British will be placed immediately.

Expansion Necessary

The controller-general indicated he is convinced Canada possesses adequate potential resources for Great Britain's full war requirements but that great industrial expansion will be necessary. Apparently it is the board's intention to purchase in the United States those items the production of which in Canada would entail considerable delay.

National Steel Car Co., Hamilton, Ont., has been turning out munitions for the British for some time and has delivered first orders in England. Company's educational orders have been pronounced satisfactory and capacity now is being enlarged.

Officials of Algoma Steel Corp., Sault Ste. Marie, Ont., say the rush of new orders since the war's outbreak has necessitated 24-hour operations. Company has completed its rail order for the South African government, but other orders have built up a backlog that assures capacity operations until April 30, at least. Algoma's $2,000,000 tin plate and black sheet mill completed recently is working overtime to meet war demands.

Canadian Car & Foundry Co., Montreal, which recently closed contracts for rolling stock for the Canadian National and Canadian Pacific railways, will run its plant at capacity to complete the orders by next May. Officials expect additional orders from abroad. The company is quoting on inquiries totaling $3,000,000.

American Investment 4 Billions in Dominion's Industrial Expansion

■ UNITED STATES is bound to have a large interest in Canada's industrialization. Our investment stake was estimated at $3,932,400,000 at the close of 1937. Canada is the second largest buyer of United States products while this country is her chief supplier. Last year we accounted for nearly 63 per cent of the dominion's imports.

The dominion's war assignment as supplier of materials rather than men already has been reflected in a speeding up of the country's industrialization.

A recent study by the National Industrial Conference board, New York, discloses the far-reaching changes in Canada's economy during recent years, points the direction her war-time industrial advance likely will follow.

Most significant have been a spectacular growth in mining and rapid expansion in manufacturing. Within a comparatively short time the dominion has become one of the world's leading suppliers of raw materials and an important producer of certain finished products. Long an outstanding source for many foodstuffs, Canada today is much less dependent upon agriculture. Substantial increase in financial resources also has accompanied its industrialization and natural resource development.

Developing great mineral reserves, Canada's mining industry has made striking progress. Doubling in value since 1932, output last year amounted to more than $444,000,000. In 1937 Canada stood first among all countries as a producer of nickel, asbestos, platinum metals and radium; third in silver and zinc; fourth in gold, copper and lead. In peacetime a nation of but 11,200,000 must export the major portion of so large a production. In time of war, however, domestic consumption obviously will soar.

Great expansion lately has been undertaken in the dominion's facilities for producing and fabricating nickel and aluminum, with an eye to future military requirements. Zinc output was increased more than 5000 per cent since 1914, copper gaining almost 1500 per cent since 1901.

Despite Canada's reserves of iron ore, none was produced from 1923 to 1938; lower-priced and higher-grade ores are obtained from the United States. Development of a new range, however, was started in 1937 in the Michipicoten district of Ontario, its reserves being estimated at 60,000,000 tons of iron carbonate with relatively high sulphur content.

Coal's position is not unlike that of ore. Enormous resources exist, yet nearly half of domestic require-

(*Please turn to Page* 78)

Editorial

The Steel Hearings

■ THE INVESTIGATION of the steel industry by the temporary national economic committee turned out to be an event of first importance.

For some years the steel industry has borne a large share of the brunt of a campaign of vilification of big business in general. It has been charged with monopoly, restraint of trade, price collusion. It has been accused of unfair labor practices, of a capitalistic sitdown strike, of having brought on the depression. The steel price basing system has been attacked again and again. From time to time the public has been encouraged to believe that steel prices were being held at unwarrantably high levels.

Charges of Monopoly Fall Before Proof of Highly Competitive Status

Testimony developed in the hearings before the temporary national economic committee marked a signal victory for the steel industry over those detractors who alleged monopoly. Painstaking and detailed questioning, based on a thorough combing of the industry beforehand, failed to unearth anything of the nature of reprehensible practices. It was shown conclusively that the steel industry is highly competitive, that it does not fix prices by illegal collusion.

The atmosphere in which the questioning was conducted also calls for gratification. Though frankly determined to get at the facts, the committee functioned in a fair and unbiased manner. The hostility, the terroristic and witch-hunting tactics that have characterized some hearings of businessmen at Washington in the past, were absent. On the whole, it seems fair to assume that the spirit in which the temporary national economic committee hearings were conducted can be construed as a manifestation of a better attitude toward business.

Investigation Clears Many Wrong Conceptions About Steel Prices

The results of the investigation are of value in a number of ways. The administration's spearhead on the economic front got the story of steel from steel itself. It developed a first-hand acquaintance with some of the men who manage industry. It learned about their problems and their requirements. It learned why certain standards are necessary in the steel business. Such information is a good thing. An adequately informed national economic committee is bound to be more helpful to the steel business, and to all business, than one that is not adequately informed.

The investigation automatically did for steel a public relations job it could not have performed by itself. This was possible for the simple reason that the story of steel stands the most penetrating scrutiny.

The hearings demonstrated that good results can come from government examination of business if it is motivated by good faith rather than political considerations.

The BUSINESS TREND

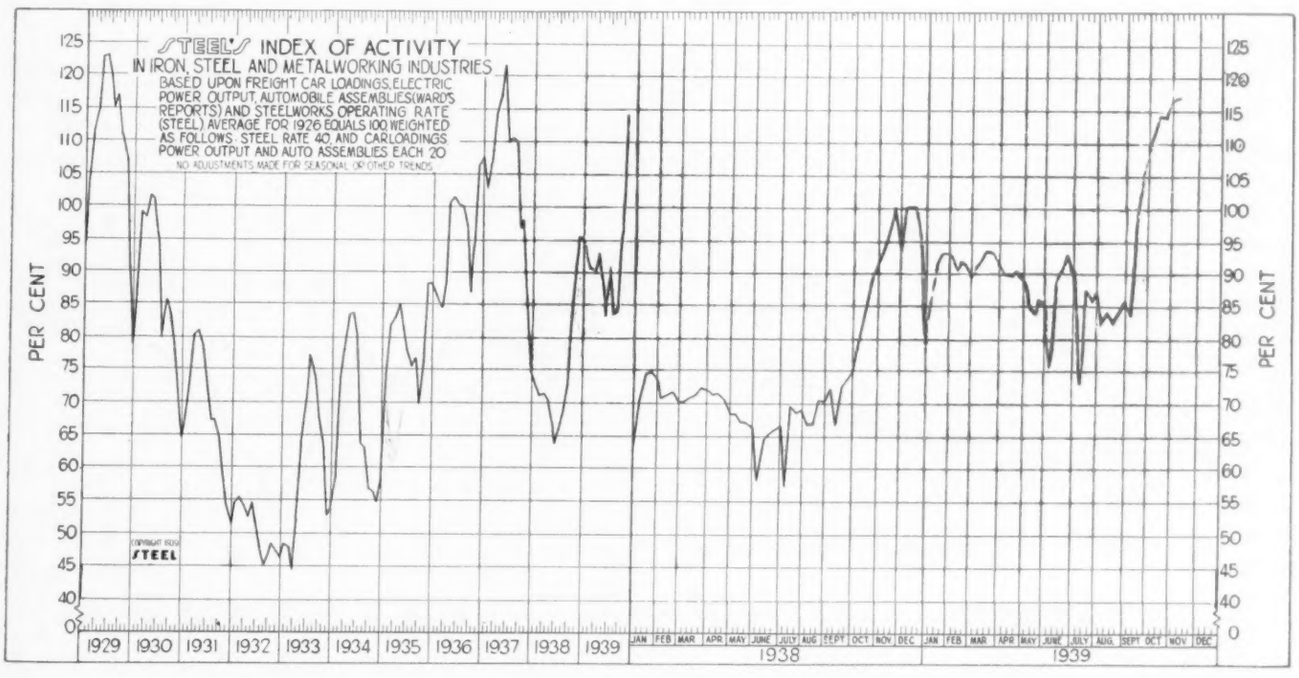
Business Activity Sustained At Near Capacity Levels

■ A MORE positive sidewise trend in business activity has developed during the past week. It appears that industrial production is leveling off at close to capacity levels, with seasonal factors forcing a moderate decline in some industrial indicators, such as revenue freight carloadings.

Reflecting the leveling off of activity in the iron, steel and metalworking industries, STEEL's index remained substantially unchanged during the week ended Nov. 11. In that week a gain of 0.1 point was recorded by the index to 117.2. This compares with the 95.9 level registered in the comparable week a year ago and is the highest level attained by the index since May 22, 1937.

Steelmaking operations held unchanged at the 93 per cent rate during the week ended Nov. 11. In the comparable period last year the national steel rate stood at 61.5 per cent. Current steel ingot production is at the highest level in history, on a tonnage basis. Pig iron output is said to be at practical capacity. Only 47 stacks of the available 235 were idle at the close of last month. A few more have been added since Oct. 31, while about half of the 47 appear unlikely ever again to produce pig iron. Some of them have not been blown for 10 years.

Pending resumption of operations at strike-bound Chrysler plants, automobile production will probably retain the current levels for some weeks. Output during the week ended Nov. 11 totaled 86,200 units, comparable with 82,690 in the preceding period and 86,094



STEEL'S index of activity advanced 0.1 point to 117.2 in the week ended Nov. 11:

Week ending	1939	1938
Aug. 26	83.4	70.3
Sept. 2	86.3	72.3
Sept. 9	83.7	66.8
Sept. 16	97.5	72.9
Sept. 23	103.0	74.0
Sept. 30	107.9	74.9
Oct. 7	112.5	78.9
Oct. 14	113.9	84.3
Oct. 21	113.6	88.7
Oct. 28	116.2	91.4
Nov. 4	117.1	93.4
Nov. 11	117.2	95.9

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

units during the corresponding period a year ago. Despite the fact that practically all plants except Chrysler's are operating at the highest levels of 1939 to-date, field stocks are being increased very slowly as retail demand continues strong.

Electric power consumption during the week ended Nov. 11 recorded the second consecutive weekly decline to 2,513,688,000 kilowatt-hours. However, power output in the latest week remains well above that recorded in the comparable week last year, and with the exception of the two preceding weeks is at the highest level on record.

Revenue freight carloadings declined less than seasonally during the week ended Nov. 11 to 785,961 cars. In the preceding week freight traffic totaled 805,862, while in the corresponding week of 1938 car loadings amounted to 636,710 cars.

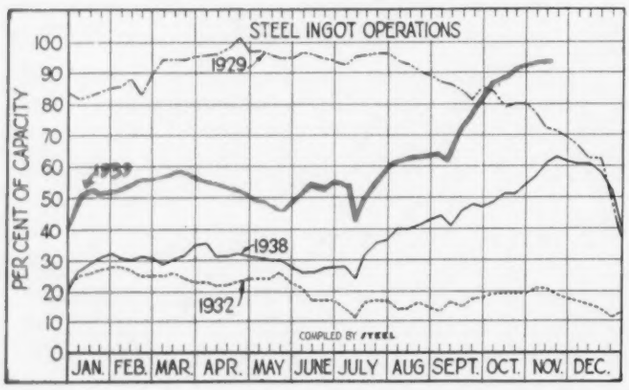
FINISHED STEEL SHIPMENTS UP SHARPLY

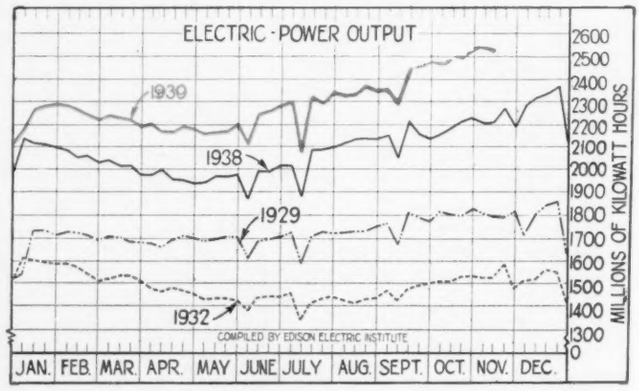
Shipments of finished steel products by the United States Steel Corp. recorded an encouraging gain to 1,218,545 tons, compared with the 985,030 tons reported shipped during September. In the corresponding month last year the corporation's finished steel shipments amounted to 663,287 tons. October shipments represented the largest monthly total since June, 1937. For the first ten months this year shipments aggregated 8,076,972 tons, an increase of 53.8 per cent over the 5,251,511 tons shipped in the comparable 1938 period.

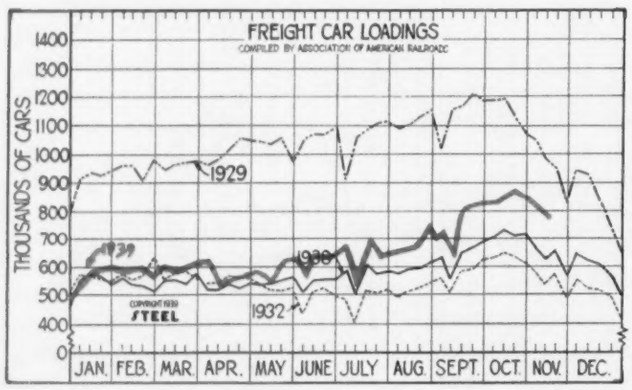
OCTOBER INGOT OUTPUT SETS RECORD

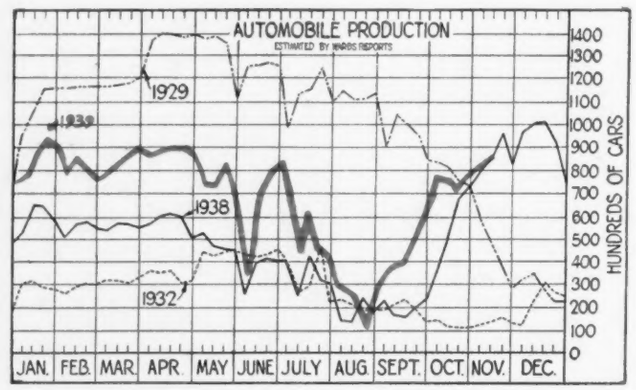
Steel ingot production during October set a new record in topping the previous record month of May, 1929. Output last month totaled 5,393,821 tons, according to the American Iron and Steel institute. September production amounted to 4,231,310 tons. Ingot operations during October were estimated at 89.17 per cent, against 72.41 in September and 52.25 in October, 1938.

Pig iron production last month also registered a sharp increase, touching an all time high for that month and was the largest tonnage produced since August, 1929. Output during October of 3,626,684 tons, represents an increase of 26.2 per cent above September's total of 2,874,054 tons. Average daily production last month was 116,990, or 22.1 per cent greater than the daily average during September.

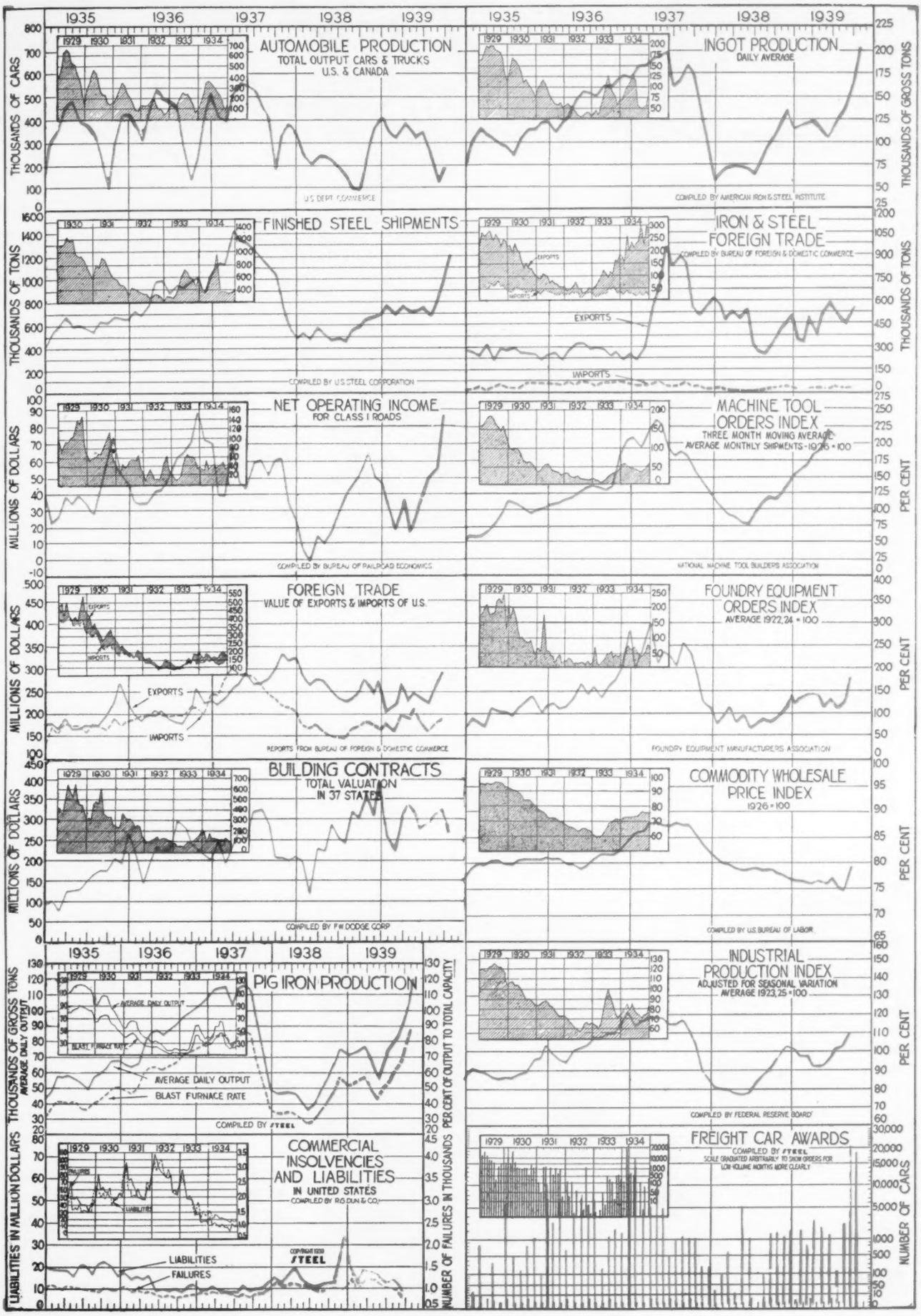








Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
July 29	60.0	37.0	16.5	96.0	2,342	2,094	1,440	1,725	660	589	511	1,104	40,595	30,390	22,461	110,163
Aug. 5	60.0	40.0	14.5	94.0	2,325	2,116	1,426	1,730	661	584	497	1,091	28,250	14,771	23,591	114,364
Aug. 12	62.0	40.0	14.5	93.0	2,333	2,134	1,415	1,733	661	589	512	1,100	24,875	13,790	21,162	111,939
Aug. 19	63.5	41.5	15.5	90.0	2,368	2,139	1,431	1,750	674	598	518	1,136	12,955	23,940	19,568	111,902
Aug. 26	63.5	43.5	14.5	89.0	2,355	2,134	1,436	1,762	689	621	538	1,160	18,365	18,700	19,896	113,316
Sept. 2	64.0	44.5	13.5	87.5	2,357	2,149	1,464	1,675	722	648	561	1,017	25,240	22,165	19,561	90,913
Sept. 9	62.0	41.5	15.5	86.0	2,290	2,048	1,423	1,806	667	569	501	1,153	26,865	17,485	21,586	104,351
Sept. 16	74.0	46.0	15.0	84.5	2,444	2,215	1,476	1,792	806	660	587	1,166	41,245	16,100	23,116	100,042
Sept. 23	79.5	48.0	17.0	82.0	2,449	2,154	1,490	1,778	815	676	596	1,202	53,950	20,390	19,327	95,453
Sept. 30	84.0	47.0	18.0	85.0	2,470	2,139	1,499	1,819	835	698	622	1,179	62,755	25,405	13.265	83,201
Oct. 7	87.5	48.5	19.0	84.0	2,465	2,154	1,506	1,806	835†	703	625	1,179	76,095	37,665	14,568	82,088
Oct. 14	89.5	51.5	19.5	79.0	2,495	2,183	1,507	1,799	845	727	650	1,186	75,860	50,540	12,675	81,882
Oct. 21	91.0	51.5	19.5	80.0	2,494	2,214	1,528	1,824	861	706	642	1,134	70.114	59,860	11,165	76,870
Oct. 28	92.0	54.5	19.5	80.0	2,539	2,226	1,533	1,816	834	709	617	1,072	78,210	65,335	11,117	73,048
Nov. 4	93.0	57.5	21.0	77.5	2,537	2,207	1,525	1,798	805	673	587	1,050	82.690	80.030	12.257	61.824
Nov. 11	93.0	61.5	21.0	73.0	2,514	2,209	1,521	1,794	786	637	537	983	86,200	86,094	13,685	49,160


1935
1936
1937
1938
1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS
U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
THOUSANDS OF CARS
THOUSANDS OF GROSS TONS
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
THOUSANDS OF TONS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
MILLIONS OF DOLLARS
PER CENT
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PERCENT OF OUTPUT TO TOTAL CAPACITY
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Unconventional

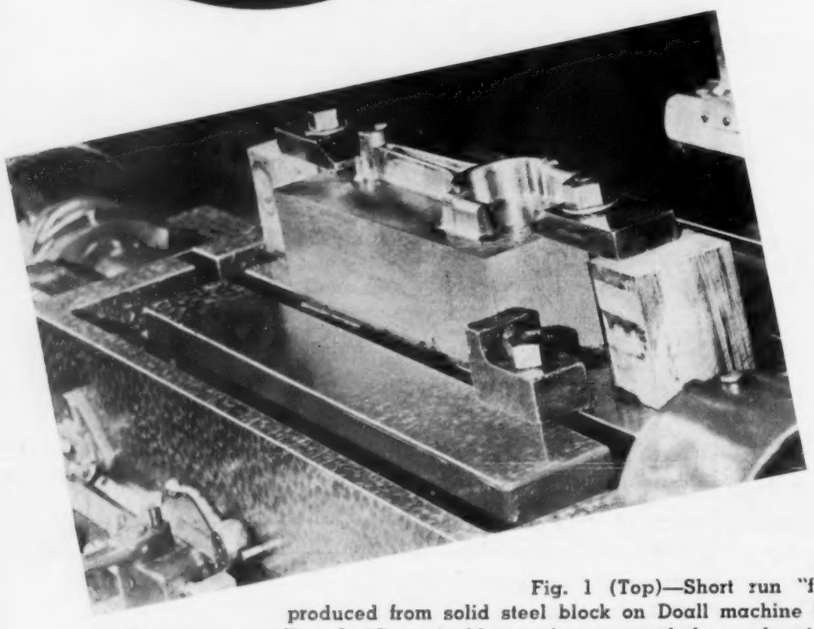
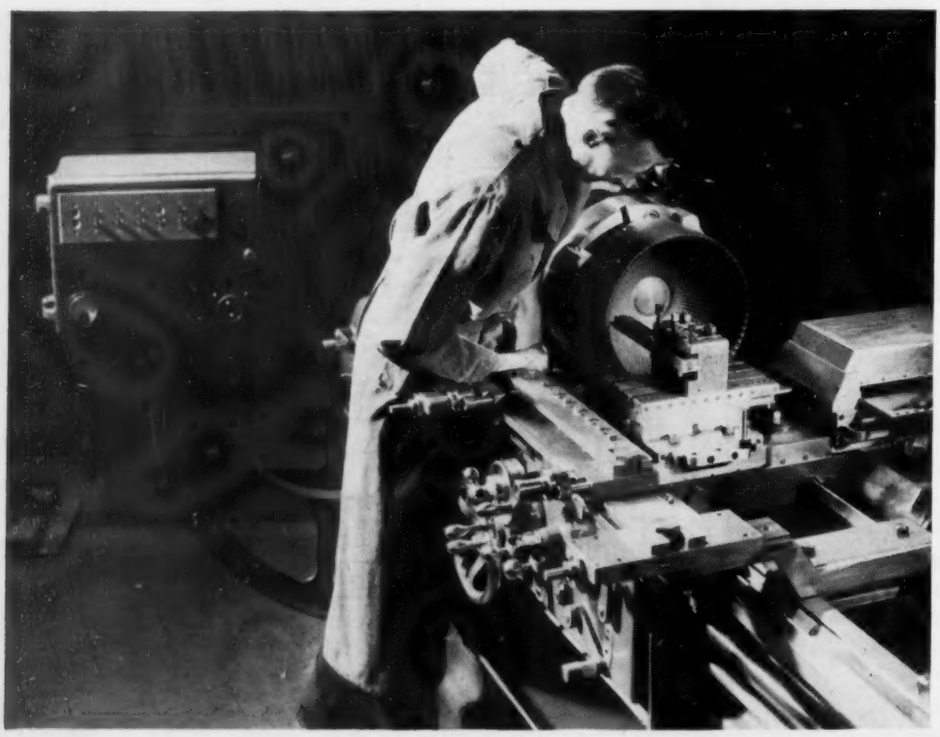


Fig. 1 (Top)—Short run "forging" as produced from solid steel block on Doall machine by contour sawing process. Fig. 2 (Center)—Master former used for embossing forging dies, "raised" in solid steel block by Kearney & Trecker rotary head die milling machine. Fig. 3 (Bottom)—"Generation" of fluted mold in Monarch-Keller lathe equipped with Kelley shape turning device



■ USE OF highly specialized, single purpose machine tools in production metalworking plants has eliminated therefrom to a large extent the old fashioned all-around mechanics as machine operators. However, their ingenuity and resourcefulness lives on today in the tooling experts and production engineers.

Under old-time conditions, this ability to get out the work efficiently was localized to individual machines here and there in the shop. Today the benefits of this ability are spread over the entire plant. Much has been said and written regarding the effect of modern machine tools in making it possible for persons of limited skill to carry on operations which a few years ago could have been accomplished only by highly skilled mechanics. Perhaps not enough has been said about the part played by the highly skilled mechanics who today must be employed in the building of such machine tools and of the ingenious production and tooling engineers who plan and co-ordinate the working of these machines in industry.

When specialized, single purpose machines are mentioned, the first reaction may be that they are so restricted in their scope that production and tooling engineers have but little opportunity to exercise their resourcefulness in connection with them. That may be true in the cases of certain very highly specialized machines but in the main the opportunities for variations in tooling are much greater than might be supposed.

Those "Tricks of The Trade"

In the old days many of the much talked of "tricks of the trade" were makeshifts forced by inadequacies in shop equipment. They were bad for the machines involved and would have no place in the modern production shop. Among such things, there might be mentioned the following: Straightening of heavy work between centers of a lathe; use of a lathe as a forcing press; cylindrical grinding in a lathe; surface grind-

By GUY HUBBARD
Machine Tool Editor

MACHINING OFTEN IS PRACTICAL

ing on a planer; and constant use of a good milling machine on rough drilling. All of these things, in moderation, are justified in some machines in certain shops under certain conditions but if there is much of the work to be done proper machines should be provided for doing it.

What I have particularly in mind in this article are those applications of unconventional machining methods which prove to be so practical that in due course they become accepted as standard practice. The history of machine shop practice in America is full of cases of this kind and new ones are coming up every day.

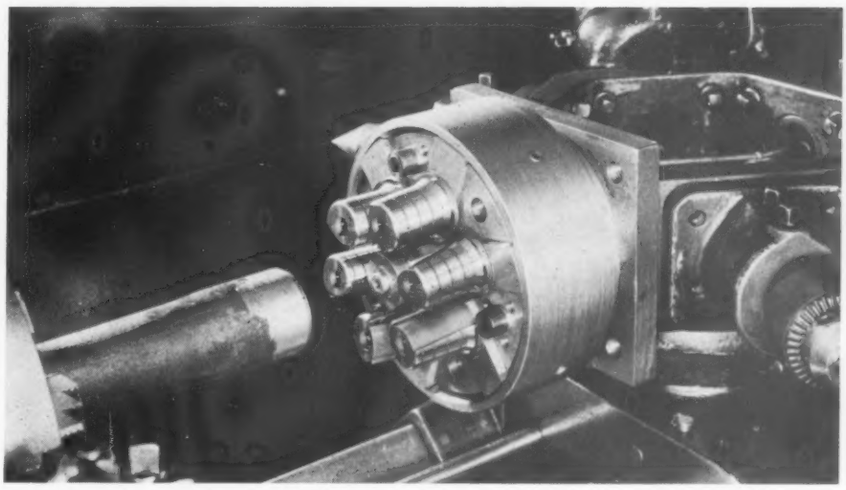
Notable Changes in Shop Practice

Take grinding for example. Not so many years ago it was limited to the finishing of parts which were so hard as to be otherwise unmachineable. Its use as a primary operation—other than for snagging castings—was almost unheard of. Incidentally, the old time mechanic would not tolerate abrasives in the near vicinity of a finished cast iron surface, believing as he did that particles would become imbedded in the surface, thereby making it into a lapping medium. Today grinding ranks with turning, planing and milling as a method of heavy duty primary machining, as well as a precision finishing means.

Then too, consider broaching. As a method for cutting keyways and splines in holes and in forming holes other than round in shape, it was accepted practice. No one even gave thought to it, however, as a method for finishing outside surfaces or as a rival to reaming as a means of sizing round holes.

Precision threading was one of the most important functions of the engine lathe, until someone with imagination came along and applied the milling process to the cutting of threads. And now grinding—once merely a "laboratory process" for finishing hardened threads—is def-

(*Please turn to Page* 76)



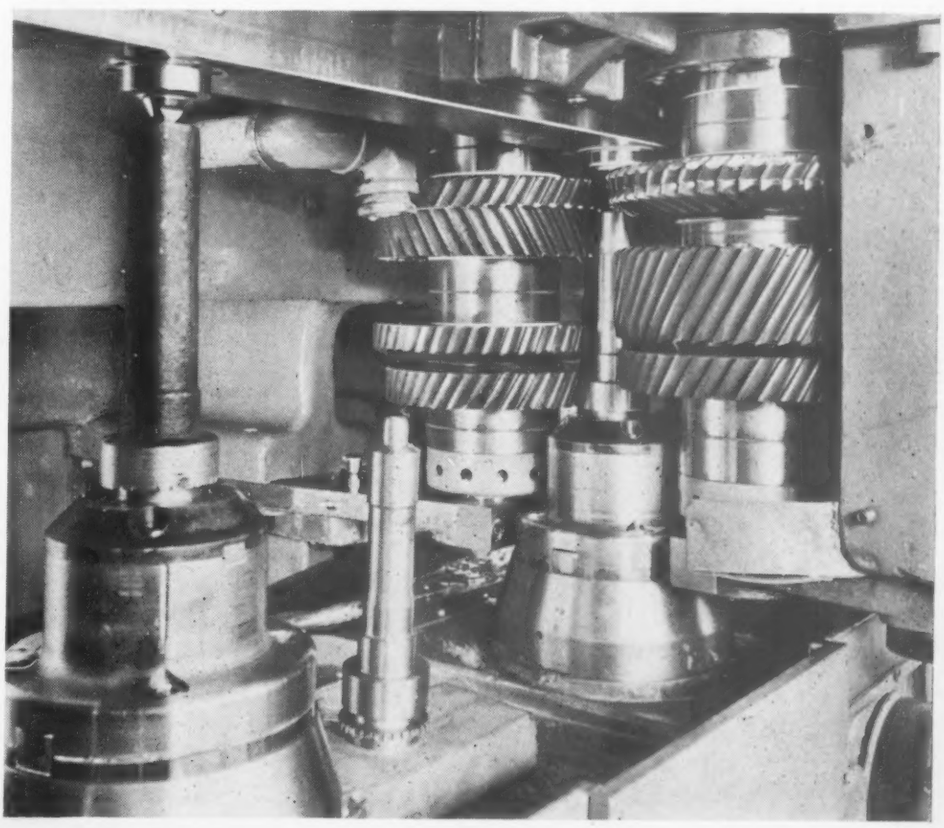


Fig. 4 (Upper)—Adaptation of National Acme circular chaser die head as "hollow mill" for preparatory machining of ends of upset tubing prior to threading operation. Fig. 5 (Lower)—Closeup of National Broach & Machine Company's Rotomill "turning" transmission clutch gear forging by use of balanced clusters of milling cutters which complete operation during 370 degrees of revolution of work

EYES

Are Expensive Targets

Statistics show 72 per cent of all eye injuries occur on jobs generally regarded as nonhazardous to eyes. One plant cuts $45,000 from yearly eye-accident cost by use of an effective program for protection of workers' eyes

■ AN ANALYSIS of 234,000 compensable accidents recently showed eye accidents responsible for 5.31 per cent of money expended for medical care and compensation. According to the National Safety Council, occupational accidents cost this country $700,000,000 during 1937. Thus approximately $37,170,000 was paid out for eye accidents.

Total number of people employed in industry is estimated at somewhere between 10,000,000 and 30,000,000. Dividing the 20,000,000 figure into the $37,000,000 total cost of eye accidents gives $1.23, almost the price of a pair of goggles. If the 10,000,000-worker figure is used, individual cost is well over $3. It is safe to say that any plant without an organized safety program is paying more than $1.23 per man per year for eye injuries. These figures justify the statement that the plant management pays for goggles regardless of whether or not they are furnished to the workers.

What is the cost of an eye accident? Assume a semiskilled man gets a tiny chip in his eye. He stops work, gets a fellow worker to see what the trouble is, walks to the first aid station, is sent to the company doctor where he has the chip lifted from his eye and goes home to nurse his injury. Next day he goes to work with two brief trips to the first aid room for treatment and has no further trouble. This can be considered a minor injury. The worker is out only half a day and requires only two brief visits to the plant hospital upon return.

Look at this: Out half a day, 4 hours, at a rate of 70 cents totals $2.80. Two trips to the plant hospital the second days at ½-hour each add another hour, 70 cents more. Five hours with machine idle at a machine rate of $1.50 add $7.50. First aid including bandages, treatment and medical supplies may total $3. Foreman's time spent in rearranging the work may easily amount to 60 cents. This makes a total of $14.60 for a minor eye injury which could have been prevented by a pair of goggles costing about 1/10 of this sum.

While these hourly rates may not agree with those in the reader's plant, nevertheless it is extremely doubtful if cost of this eye injury would ever be below $6 or $7, the cost of a pair of goggles per year for several years. On any basis, it is evident the slightest eye injury costs more than the goggles that would have prevented it.

Accident costs in plants are extremely interesting. The analysis of 234,000 compensable accidents showed average compensation and medical costs for an eye injury to be $343. This money actually was paid out by insurance companies for medical expense and for compensation to workers who had eye accidents. Compare this with the average of $194 each for compensation and medical attention for all other accidents excluding eye accidents.

It is evident the cost of an eye injury is almost double that of any other average injury. Thus compensation and medical costs in a plant

From a paper presented at a recent safety conference in Detroit.

By K. R. SUTHERLAND
American Optical Co.
Southbridge, Mass.

can be reduced greatly by decreasing number of eye injuries.

Causes of eye injuries, according to National Safety Council and based on reports from five state labor departments or industrial commissions, may be tabulated as follows:

Cause	Number of Eye Accidents
Handling objects	295
Falls	56
Machinery	426
Vehicles	59
Falling objects	73
Using hand tools	1136
Miscellaneous	5463

Note 72 per cent of all eye accidents are classified as miscellaneous. This indicates that not only is the classification inadequate, but that these accidents are occurring in all parts of the plant. This is the justification for asking everyone in a manufacturing plant to wear goggles. The tabulation also indicates that jobs generally regarded as hazardous to eyes are not the jobs where eye accidents actually occur because here the workers usually wear goggles.

On the other hand, the jobs where the eye accidents do occur are those regarded as not hazardous and thus the eyes are unnecessarily exposed. Even if accidents in this one group were cut from 72 to 36 per cent or even to 20 per cent, there still would be sufficient reason for asking all workers throughout a plant to wear goggles.

Of course, some industries are less hazardous than others. It might not be necessary for every worker in a textile mill to wear goggles. However, it would certainly be reasonable to ask every man to wear goggles in a plant where metal is machined, fabricated, cast or forged.

How can eye accidents be prevented and eye injury costs lowered? Here are two suggestions, neither one of which has anything to do with mandatory rules or making a plant survey.

Forget eye accidents for a minute, and look at another phase of the business. If a shop superintendent or production manager wants a new piece of equipment on the floor, he usually fortifies himself with facts and figures concerning the cost of manufacturing a part or unit with the old equipment and the cost of making those same parts with the new equipment. Then, knowing how much money will be saved, what the production will be and the probable return on the money invested, he goes to see the works manager or plant operating committee and the decision to purchase the machine is based largely upon the comparison and savings data that he has prepared.

Now look at accident costs. How many men can go before an operating committee and quote actual accident costs, compare this with the cost of equipment needed to eliminate these accidents and show the savings that can be made? This emphasizes that probably the first and most important thing to do in starting a good eye-protection program is to keep adequate and accurate records of accident costs.

Beside getting a man's personal history, find out what he was doing when the accident occurred, how he was doing it and any other allied information. Cost of medical expense can be obtained from the plant hospital. Figures on compensation or lost time, as well as lost machine time, can be furnished by the accounting department. The foreman or superintendent will know whether any work was spoiled and may be able to add other information to the report.

Report in Dollars and Cents

The second suggestion is to make reports in terms of dollars and cents. Such a report means much more than when given in terms of lost man hours. Suppose 200 man hours were lost in a department one month and a recommendation was made to spend $100 to equip the workers with goggles. Such a proposition probably would meet with little response. On the other hand, suppose the statement is made that $200 was lost because of eye injuries and that for $100 everybody in the department could be equipped with goggles to prevent recurrence of this expense. It is easy to see

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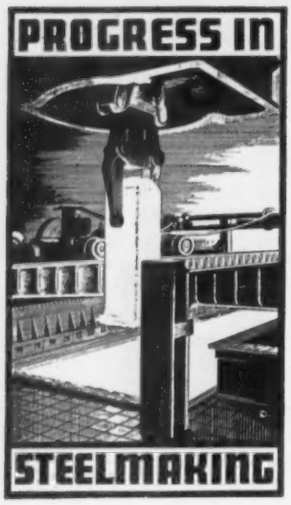

"Dry" Furnace Practice

Modern air conditioning makes dry air blast economically practical. Importance of this feature of blast-furnace operation is emphasized by results of recent noteworthy installation described here

■ THE IDEA of "dry blast" is by no means a new one. As early as 1880, attempts were made to regulate the moisture content of the air blast using various chemicals. Refrigeration was attempted in 1890. The basic concept is that removal of water vapor from the air blast affords definite economies in coke and increases furnace output as well as permitting greater uniformity in operation.

Advances made in air conditioning during recent years appear to make the dry blast practical for the first time, judging from results being obtained at the installation of Woodward Iron Works, Woodward, Ala. This is a medium-sized furnace with a 400 to 550-ton-per-day output of merchant pig iron on a metallic yield of approximately 36 per cent.

A moderate dew point of 40 degrees (slightly less than 3 grains per cubic foot in free air) was selected as the most practical. A turbine-driven centrifugal refrigeration machine rated 520 tons per day is used to cool the 1200 gallons per minute of water necessary.

Water is removed from the air by cooling and condensing sprays on the suction side of the blowing engine. Outside air is drawn in through the intake stack at upper right of Fig. 3 and carried from the dew-point chamber to the blowing engine by the round duct which runs off to the left. The two vertical ducts then go underground to feed the two blowing engines.

This is Part I of an abstract from a paper presented by L. Logan Lewis, vice president, Carrier Corp., Syracuse, N. Y., at Eastern Air-Conditioning conference sponsored by American Society of Refrigerating Engineers, Lehigh university, Bethlehem, Pa., and used here through courtesy of "Refrigerating Engineering," 37 West Thirty-ninth street, New York. Part II, appearing next week, will give costs

The dehumidifier shown in Figs. 1 and 2 is a 2-stage unit with partial elimination between stages. The water is pumped, as per diagram Fig. 4, from the sump of the second air stage to the sprays of the first air stage and then back from the sump to the first air stage through the refrigerating machine. This 2-zone cooling or cooling in stages gives most efficient operation of the spray system. The casing is constructed of concrete, and the moisture eliminators back of each bank of sprays are of a special rugged construction.

While only placed in operation the latter part of June, already the results are noteworthy. The response of the furnace to drier wind was immediate and impressive. Burden was promptly increased. An important reduction in coke per ton of iron followed immediately, and the silicon content of the iron also responded to the lowered moisture content.

Thus the theory of benefits to be obtained from use of dry blast appears well borne out in actual practice, previous unsatisfactory results being due largely to lack of the modern air conditioning equipment now available. The demand for tighter product specifications and noteworthy improvements in furnace practice have emphasized the importance of weather variations.

Basically, the problem of producing at full or part capacity and at maximum economy a product of closely determined specifications is that of regularity or stability in operation of the blast furnace.

For a burden of regular quality and a predetermined rate of production, a constant number of pounds of oxygen is required. Many furnaces vary the speed of the blowing engines to correct for outside air temperature and some for barometer. These compensations are simple and easy to make, but without accurately controlled dry blast, another important compensation must

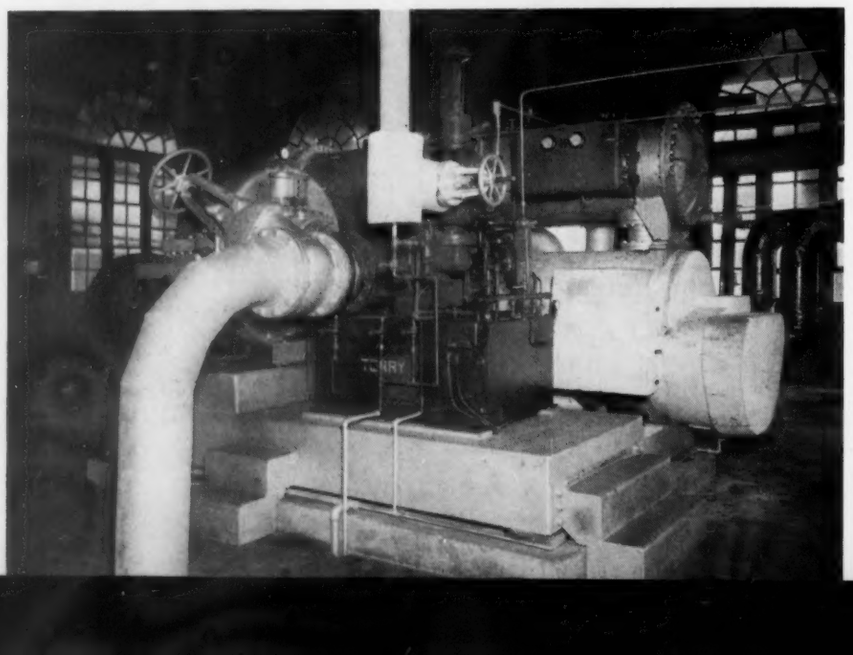

Fig. 1—Centrifugal refrigeraton machine at Woodward Iron Works is driven by a steam turbine, the speed of which is controlled automatically to maintain temperature of the chilled water regardless of the refrigerating load

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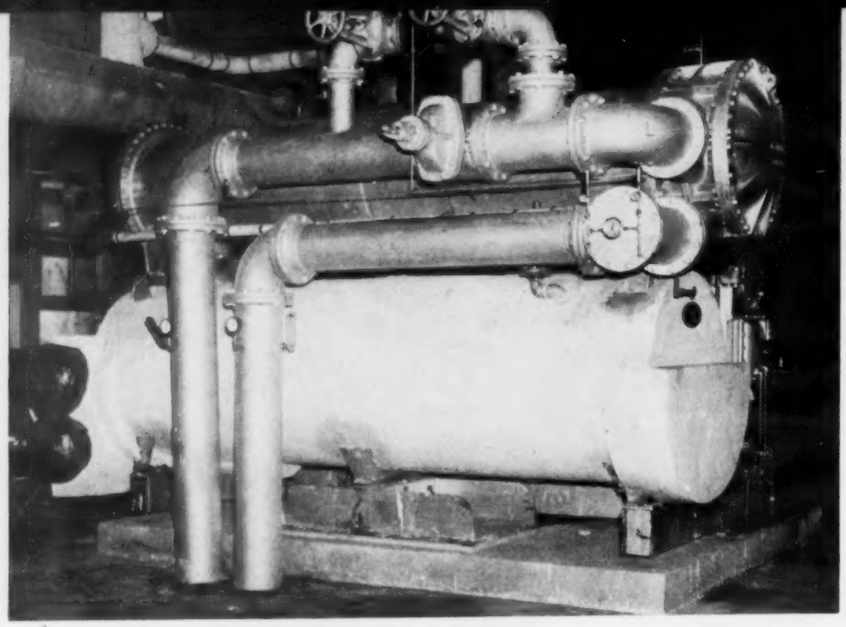


Fig. 2—Condenser and cooler side of centrifugal machine at Woodward. Condenser utilizes cooling-tower water, 1600 gallons per minute, raising it from 80 to 98.45 degrees Fahr.

be made for moisture content if the full benefits of regularity are to be enjoyed.

Water vapor entering the lower section of the furnace encounters temperatures which break it down into hydrogen and carbon monoxide. The heat thus absorbed by 1 pound of vapor amounts to 2850 B.t.u. While extra fuel must be burned, the heat required is not an item of great magnitude in the entire heat balance of the furnace. However, the entire effect is localized in the reduction zone, and this undoubtedly has a material effect on reducing power. Consequent irregularities in this zone also affect other zones, thus contributing greatly to irregular operation.

The quantities of water removed from the air going to the furnace are tremendous. Normal capacity of the Woodward furnace necessitates 45,000 to 50,000 cubic feet of air per minute, which amounts to 2700 net tons of air per day, or 5.6 tons per ton of iron. Reducing moisture content of air supplied by 1 grain of moisture cubic foot of air per minute means a little more than 5 net tons water per day. On a maximum day, the Woodward dry blast plant prevents more than 30 tons of water from entering the furnace.

Without a dry blast, variations in moisture content are fought by some operators by varying the temperature of the hot blast. General practice is to allow 25 to 50 degrees for each grain of moisture per cubic foot of free air, an appreciable item in the heat balance. It also requires that a reserve capacity be left in the stoves in anticipation of sudden rises. Also, with rapidly falling dew point, the temperature of the blast must be depressed below this practical maximum.

With the charge introduced some 10 to 12 hours before it reaches the hearth, weather must either be predicted accurately hours in advance or else ample leeway must be left in hot-blast temperature for the purpose of keeping the furnace regular until the burden can be changed to conform to weather changes.

Lowering moisture in the blast reduces amount of coke to be burned for each ton of iron produced and increases total output obtainable from furnace. Reduction of one grain of moisture per cubic foot of air amounts to about 48 pounds of coke per ton of iron. A reduction of little more than six grains at Woodward thus means about 300 pounds of coke can be saved per ton of iron.

This tangible, plus that of increased production, is of at least sufficient magnitude to cover more than the operating and maintenance costs of the dry blast equipment. Thus the intangibles in form of regularity and power to produce at will within narrow limits the quality or kind of iron, desired clean and free from kish or scruff, are additional benefits of vital interest which are obtained over and above the tangible returns.

Equipment Available

Today there is available a wide variety of fully developed and practical air-conditioning equipment which may be combined into several types of dry blast plants, each having widely varying characteristics. Points of difference include the form, shape and principle of the equipment, the amount of and form in which energy is required and also the point at which it must be applied to the system. Also, there is wide variation in first cost.

An attempt will be made here to clarify some of these apparently confusing issues and to provide a foundation upon which economic studies may be based and to point the way toward the selection of the type of plant most economical for the different conditions to be encountered at different furnaces.

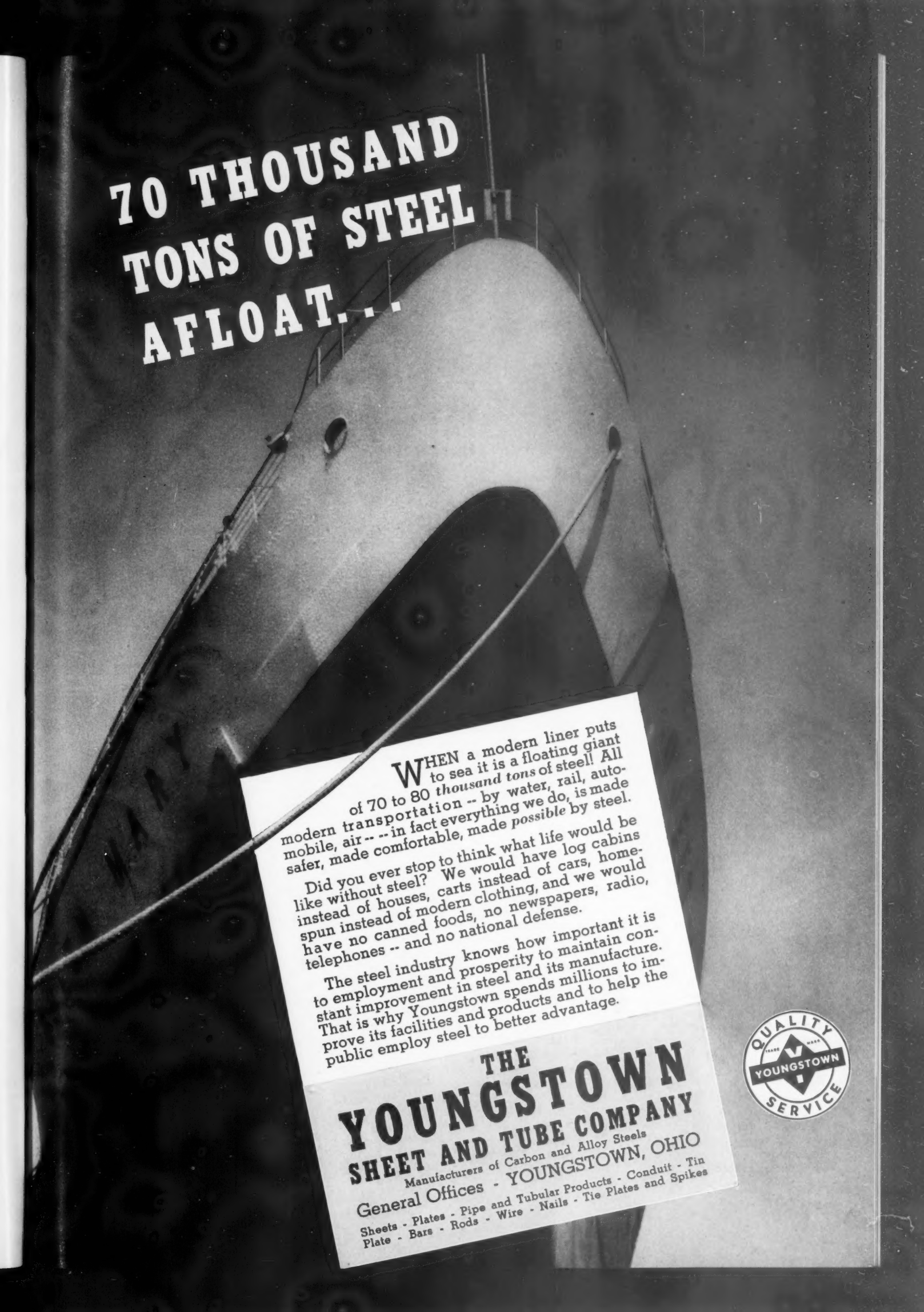
To cover the entire range of practical systems is not possible here since consideration must be limited to the several more widely applicable combinations of commercial equipment that are suitable for the unusual working conditions of furnace and plant.

As to basic methods, moisture content may be lowered by condensation, by dehydration or by a combination of the two.

Condensation may be accomplished by spraying chilled water in direct contact with air or indirectly by means of cooling coils. Effective water sprays will saturate the leaving air. Dew point of air leaving coils, however, will be depressed below the leaving dry bulb.

Practical dehydrants include solid adsorbents such as silica gel and activated alumina as well as the liquid absorbent, lithium chloride. As contrasted with action of sprays, action of a dehydrant is to convert the latent heat of the moisture ad-

Fig. 3—Spray dehumidifier at Woodward. Air intake is through stack rising at extreme right. Suction line carrying cooled and dried air runs to left. Vertical ducts go underground to blowing engines



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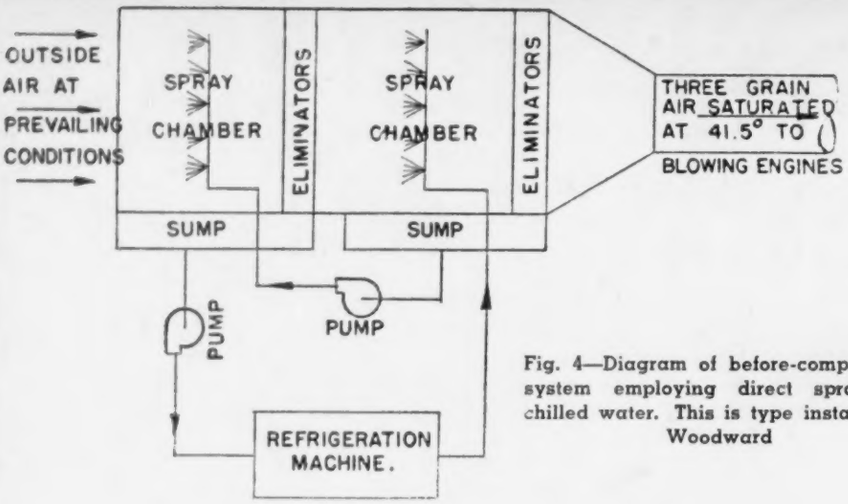

Fig. 4—Diagram of before-compression system employing direct sprays of chilled water. This is type installed at Woodward

sorbed into sensible heat. Released in whole or in part, this then superheats the air stream.

Equipment employing any of these means may be applied to the wind at atmospheric pressure before it is compressed, or it may be applied at blast pressure after it has been compressed. Between before-compression and after-compression systems, there are four basic points of characteristic difference of major importance: temperature range in which work is to be done, total work to be done, means employed for automatic control and effect upon power required for blowing.

Removal by Condensation Before Compression

Condensing moisture by cooling with direct sprays of chilled water is the simplest and most rugged in equipment and control. For same final moisture content, temperature range in which work is done is lowest of all. Lowest practical dew point is that used at Woodward, 40 degrees (slightly less than three grains of moisture per cubic foot of free air). Amount of work to be done, however, is greatest for this type of plant.

Dr. Carrier's original basic dew point control operates quite satisfactorily. An alternate system is to regulate automatically the temperature of the chilled water leaving the refrigerating machine. Such a control, however, must be readjusted for long swing or seasonal variations in outside conditions, total range from summer to winter being about 4 degrees.

If value of regularity throughout the year should warrant, moisture may be added to the air during the winter months with this type of plant.

By substituting brine for water or by adding a brine spray stage, a subfreezing dew point can be obtained. Cooling to a temperature of 24 degrees gives one and a half grains per cubic foot of free air; to about 16 degrees, one grain. In direct spraying, the condensed moisture weakens the brine, which must be concentrated or regenerated to keep up full strength.

Spiral-wound or plate-finned cooling coils may be substituted for direct sprays. These may be served with chilled water, chilled brine or liquid refrigerants such as ammonia or freon for direct expansion. However, if dew-point temperature approaches too closely the freezing point of water, frost and ice will accumulate, necessitating provisions for cutting coil units out of blast and melting off the ice. Thus, it is highly undesirable to go below the frost point as frost insulates and thus reduces capacity or efficiency, or both.

An important feature of cooling-before-compression plants is that they deliver air to the blowing engines at the lowest temperature of all. As power required to compress varies with absolute temperature of the air entering the compressor, it is possible to reduce the total amount of power required for blowing the furnace by more than is necessary to operate the dry-blast equipment, an important consideration.

Removal by Condensation After Compression

Most attractive feature of the after-compression condensation plant is that fairly low subfreezing dew points can be obtained without resort to subfreezing temperature. Air does not absorb water in the manner of a sponge, absolute humidity following the law of partial pressures.

This means the suction temperature at which the refrigerating machine must operate is raised and requisite horsepower per ton of refrigeration reduced. Also as the suction temperature rises, the volume of gaseous refrigerant which must be pumped decreases.

Total amount of work to be done, however, is increased by the amount of the heat of compression. At the same time, 50 to 70 per cent of the heat of compression can be recovered.

Standard air-conditioning coils, sprays and heat-exchanging equipment cannot be applied without due consideration of strength to withstand pulsations created by reciprocating blowing engines. They impose special requirements on all types of plants but are of greatest magnitude on the compression side.

Adequate automatic control systems are available for this type of plant as well as the before-compression condensation systems.

Dehydration with Solid Adsorbents

Most commonly used adsorbents are silica gel and activated alumina. They are granular in form and normally are held in beds 1, 2 or 3 inches thick between fine wire mesh. The air from which moisture is to be removed is drawn through these beds. Water vapor contacting the adsorbent is held by the material. This continues until an equilibrium is reached where the adsorbing action ceases. As equilibrium is approached the bed is cut out of the air circuit and reactivated with heated air. The cycle of adsorption and reactivation then is repeated.

In a single-stage at practical bed depths, air containing ten grains of moisture per cubic foot can be reduced to five grains. In two stages with interspaced cooling employing 85-degree water, ten-grain air can be reduced to two grains. Placed in series with the Woodward type as a preconditioning plant, one stage of adsorption will bring the final moisture content to one grain.

The latent heat of moisture is converted into sensible heat which is transferred to the adsorbent and its container. A 10-degree Fahr. rise is attained for each grain of moisture removed. This excess heat must be removed before the air goes to the blowing engines. Otherwise their capacity will be reduced and power required greatly increased. Thus air must be aftercooled if dehydration is placed on the suction side of the engine.

Automatic control for this system must take into consideration the gradual exhaustion of a given bed as it approached equilibrium and at the same time counteract fluctuations caused by other variables. Plant usually is divided into several units, each of which is timed to cycle in sequence and at predetermined intervals. Moisture content of a portion of the air must be lowered below the desired dew point and then brought back up again by the admission of moist unconditioned air through a bypass.

An attractive feature of solid adsorbents for dry blast is that reactivation can be accomplished with

(*Please turn to Page* 82)

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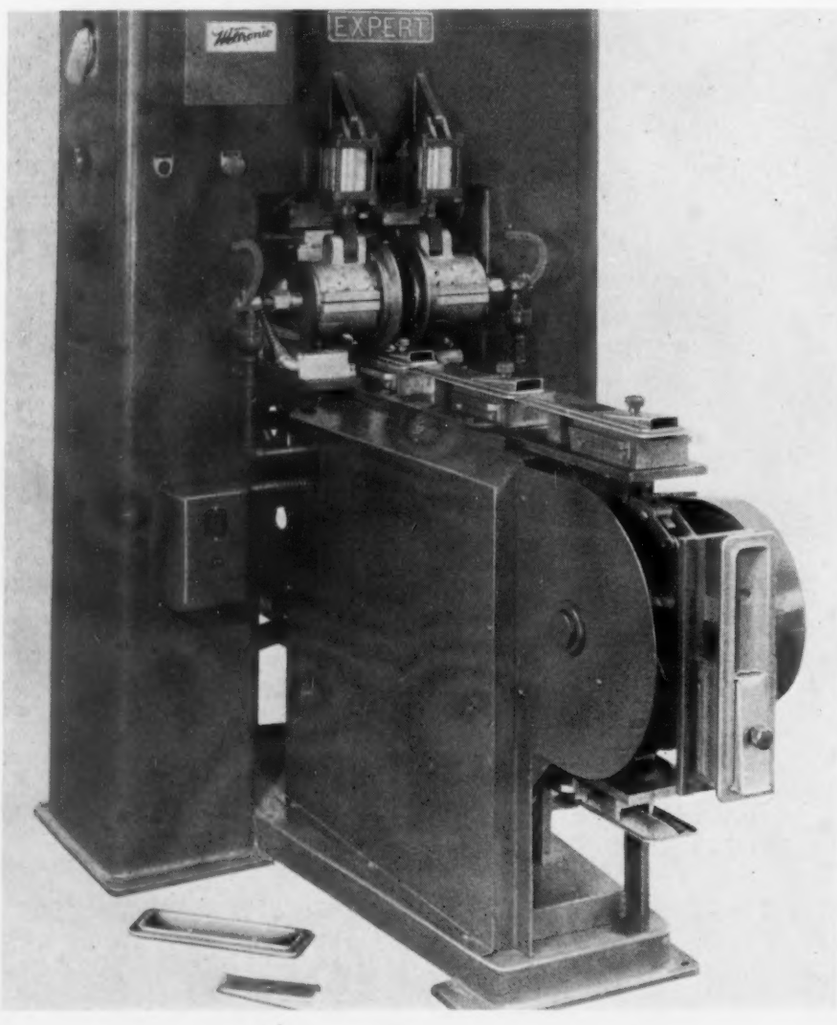
Machine welds 450 units per hour using built-in conveyor for continuous movement of work through welder. Conveyor speed is synchronized with production requirements, thus eliminating storage of finished or unfinished parts

■ WITH welding machines, as with much other present-day manufacturing equipment, high speed production is obtained only when suitable provision has been made for getting the work to and away from the machines at maximum speed and with least disturbance to the actual production operation.

In many modern production machines, there is a distinct trend to build in a conveyor which is synchronized with other conveyors in the plant to carry work to and away from the machine. A good example of this trend is shown in the accompanying illustration where a new automatic continuous spot welder is fitted with a motor-driven conveyor which handles the work going through the machine. This conveyor carries ten short-circuiting dies, on which are placed either 18 or 12-inch valve cover plates. A baffle plate is placed on top of the cover plate, and the two are located and held in correct relative position by means of a stud with a bayonet fitting which permits quick loading and unloading of the carrier.

As the conveyor carries a loaded die under the dual rolls of the seam welder, a cam on the side of the die trips an air valve. This admits air into the pressure cylinder, bringing the rolls into contact with the work. A limit switch automatically starts the timer. The welder passes current down one wheel, through the work and back up into the second contacting wheel, welding by heat created due to passage of the current through the work. Immediately after the last spot is completed, the cam on the side of the moving die releases the pressure switch. This cuts out the timer and raises the rolls from the work.



New welder features built-in conveyor, timer, transformer, internal cooling for contacting rolls, low-impedance transformer with close-coupled inductive loop. Note fixtures mounted on conveyor for rapid loading and unloading of the work

Timer Controls Welding

The machine, designed and built by Expert Welding Machine Co., Detroit, features a timer made by Weltronic Corp., 2832 East Grand boulevard, Detroit. It is this timer that makes possible continuous automatic spot welding using a seam welding machine. This innovation gives accurate spacing of the welds and also accurately controls length of the weld. The timer does this by controlling length of time current is on and off. It also provides an automatic repeating cycle.

The machine thus not only is able to make accurately spaced spots, but also by adjusting the timer it is possible to vary the size

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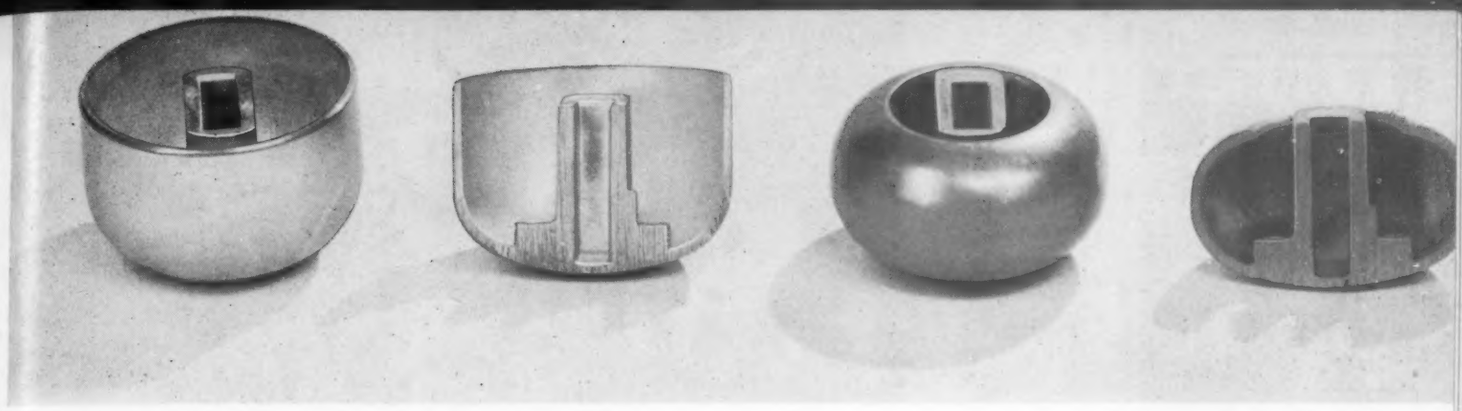


Cold-Formed Die Castings Offer Unusual Advantages

■ UNTIL recently it was essential that walls of hollow die-cast parts be in straight sections to avoid undercuts and to permit the removal of cores from the casting die.

However, a new method has been developed by Doehler Die Casting Co., Toledo, O., making it feasible to cast certain parts in straight section and subsequently shape them as may be desired. This means that hollow parts now can be produced as zinc alloy die castings with all the inherent physical and economic advantages of the metal and the process.

The outstanding difference between sheet metal stampings and cold formed die castings is that in the case of the latter, all of the advantages characteristics of die castings, such as finish and intricate details, are transmitted to the finished parts.

Cold-formed parts now are being offered in all standard zinc die casting alloys, including Nos. 2, 3 and 5 in both Doler-Zink and Zamak specifications. The first of the three alloys has a tensile strength of 47,900 pounds, the second 40,300 and the third 45,400. Brinell hardnesses are 83, 74 and 79 respectively. Impact strengths (Charpy) are 19.0 for No. 2 and 20.0 for both Nos. 3 and 5.

Because of the method of forming, there is a decided saving in weight and increased production due to the thin walls obtainable. Parts such as knobs or handles which formerly were cast solid or required assemblies of stampings, screw machine parts, etc., now may be produced hollow in one piece. Resulting assembly and machining economies are considerable.

The new method simplifies the finishing problem, particularly if a part is to be plated. Generally it is accepted that a superior finish can be secured on parts having thin uniform walls compared with those having solid, heavy sections. Then, too, all of the examples shown here if cast solid would have parting line seams at the largest diameter. This would mean a grinding operation prior to buffing, which is not necessary with the cold-formed parts. The parting line on parts fashioned in this manner is entirely removed in the trimming operation.

Referring to Fig. 1 at top of page, a knob as die cast is shown at left. At right is the same part after forming. Similarly, a handwheel for a lathe made by the new method is shown in Fig. 2. It has the finished appearance of a solid piece of metal.

The method also has a number of other interesting possibilities such as the one illustrated in Fig. 4. Here a small die-cast disk, second from left, is positioned in the door knob during the forming operation by means of a beveled section. This same method can be applied to widely varying objects.

Fig. 3 illustrates a typical cold-formed knob.

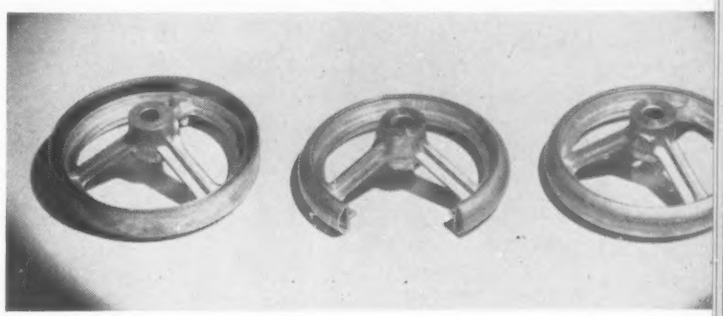


Fig. 2—Die-cast handwheel. At left, the unit appears as cast. Center shows a sectioned piece after it has been formed. The completed handwheel at right has the appearance of a solid unit. Photos courtesy New Jersey Zinc Co., 160 Front street, New York

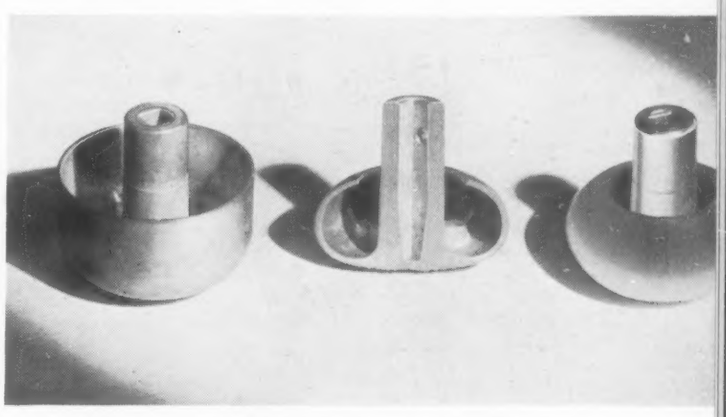
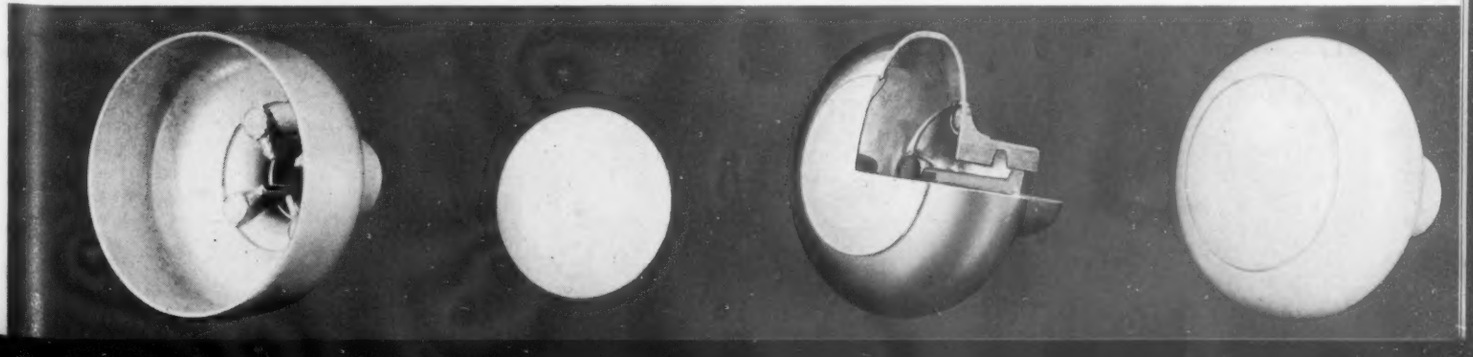


Fig. 3. (Above)—Here is a knob made by the new method. The cast piece at left is cold formed to shape at right. Sectioned piece in center shows economy of material obtained.
Fig. 4. (Below)—The new method permits enclosures to be rolled in when shaping the piece as shown here



Welded Piping System

. . . reduces friction loss 15 per cent, cuts cost of joints and fittings 46.8 per cent, eliminates 124 gasketed joints and their maintenance, provides stronger joints, gives more headroom with other direct and indirect advantages

By HOWARD WEISS
Engineer
Dingle-Clark Co.
Engineers Building
Cleveland

■ MODERN rolling mills contain heavy concentrations of rotating electric machinery. Such motor rooms are provided with the largest electric motors used in industry. Usually these are direct-current machines fed from motor-generator sets in the same room.

These large machines are cooled by forced currents of air to permit their size to be within economical limits for construction, transportation and operation. So important is this forced-draft cooling that airflow relays are provided in the air ducts to shut down the machines if the air supply fails. Heart of the cooling system is a finned water-tube cooler which removes heat from the air. Only a small percentage of outside air enters the circulatory system as most of these are of the recirculating type.

The importance of a reliable long-lived piping system to supply the large quantity of water required by the coolers cannot be overestimated. Failure of the water systems results in costly shutdowns of a mill whose earning power is dependent on long periods of continuous operation. Typical of these piping systems is that provided for the slabbing mill of Edgar Thomson works of Carnegie-Illinois Steel Co. at Braddock, Pa., and described here.

Piping System Important

This system supplies 410 gallons per minute of cooled water to two variable voltage generator sets, 1950 gallons per minute to a fly wheel motor-generator set, 1550 gallons per minute to the main drive motors and 600 gallons per minute to two 1500-kilowatt auxiliary sets.

As is the case in many new mills, to speed construction, the contracts were let before the layouts were completed. The price for the piping system was determined before the complete layout was available. In working out the final design, the original price demanded most careful consideration of pipe sizes, fitting and accessory sizes, etc. to keep costs to the very minimum and still obtain the efficiency desired.

The contract specified that raw water supplied to the system at a pressure of 20 pounds per square inch must be returned to the general mill system at not less than 5 pounds per square inch. Thus maximum tolerated friction loss throughout the entire system was 15 pounds per square inch, the limiting factor in determining pipe and fitting sizes. This pressure drop includes the coolers themselves. With the motor-room basement crowded with equipment, the system involved short lengths of pipe and a large number of fittings. The best system would be one that provided the smoothest flow of water, minimizing turbulence which constitutes the larger part of the friction loss.

Pipe sizes are determined by both pressure drop and velocity calculations and conservative figures were used as no calculations can predict accurately the exact loss.

First the job was figured using a flanged joint, and this was followed by figuring a welded-and-flanged system. In comparing costs between the flanged and the flanged-welded job, costs of pipe and pipe hanging were omitted because they are essentially the same in both cases. The high cost of fittings and the large amount of labor on the flanged job invited a comparison by welding. Valves remained flanged because of the owner's preference, and cooler nozzles also were fitted with flanged elbows.

All other fittings such as tees, couplings and elbows were eliminated in the welded-and-flanged layout. Tees were made by burning a hole in the main and butt welding the branch pipe into place. Elbows were replaced by pipe bends. Pipe was shop fabricated and needed to be welded in place in the field. Longer runs of pipe required several lengths butt welded together.

Reducing fittings were eliminated by swaging the larger pipe and butt welding to the smaller pipe. Many abrupt changes were thus eliminated. Furthermore, the bends were made with such curvature as to provide minimum loss and maximum strength. Five was chosen as the ratio of bend radius to pipe diameter. The loss in such a 90-degree bend is less than one half that of the usual fitting.

Friction Loss Reduced

Tabulation of pressure drops in the two systems showed a sharp reduction in friction loss by introduction of welding. Maximum pressure drop is 12.69 pounds per square inch using welding compared to 14.99 pounds per square inch for the flanged job, despite the use of the same pipe sizes. This is a 15 per cent reduction in friction loss, which means 15 per cent less power required by the pumps to circulate the same water in the same pipes when welded instead of flanged exclusively.

Actual reduction in pipe friction is greater than this, since the above figures include the drops through the coolers themselves and the large strainer. Reduction in friction loss justifies the use of smaller sizes of pipe in some runs. However, this system was designed for hard serv-

(*Please turn to Page* 84)

Abstract from paper receiving award in $200,000 Program sponsored by James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland.

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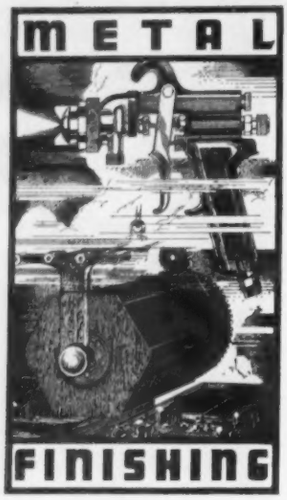

Better Adherence

Results of elaborate laboratory tests over extended periods as presented here point the way to obtaining improved adherence of finishes on surfaces of zinc or zinc-alloy articles as well as on zinc-coated metals such as galvanized steel

By **HOWARD E. VAN SICLEN**
Fanwood, N. J.

■ ZINC AND zinc-coated surfaces have provided a serious problem in finishing, principally because of the rapid loss of adherence of organic finishes on zinc as compared to other metal surfaces. Typical examples of this early failure are not difficult to find in those industries where zinc is used.

Experience has shown that galvanized iron which has been painted and exposed will show cracking and peeling of the finish after short periods of service. Finished parts of equipment and apparatus manufactured from zinc, zinc alloys and zinc-coated metals sometimes have indicated insufficient adherence after only a few months in storage. In many instances the finish has retained good adherence for a reasonable period of time and then completely lost its adhesion.

Theories to explain this type of failure include: The zinc surface is too smooth, consequently offers poor adherence; the zinc destroys normal orientation of molecules of the finish toward the metal surfaces, resulting in lack of adherence; a compound formed at interface between the zinc and organic finish offers no great degree of adherence to either.

According to these theories, it is only necessary to roughen the zinc surface to improve finish adherence. Weathering, sand blasting, etching with acids or acidulated solvents are still used for this purpose today. However, improvements made by use of such methods are not entirely satisfactory.

Molecule Orientation

Regarding zinc's influence on molecule orientation, it is claimed that the metal surface or the oxide film exerts a selective absorption on the individual constituents in the vehicle of a finishing material*. Thus the most active constituents which will then be the most prominent at the metal-finish interface may give the weakest cohesive strength. Consequently a decrease in the normal adherent properties of the finish is the result.

To support the theory on the formation of compounds at the interface, it has been shown definitely that reactions can take place between the zinc surface and the constituents of a finish.** The compounds formed by these reactions actually are present on the paint film and often are visible when the film is broken away from the metal. Zinc formate has been identified as one of the products and probably is a cause of some failures.

These theories and the research thus far conducted in this field indicate that the most essential feature is the condition of the zinc surface at the interface and its relation to the specific finishing material applied. The surface should be of a

This paper presents results of work done by the author under supervision of H. G. Arlt while at Bell Telephone Laboratories, Inc., 463 West street, New York, and before his transfer to Western Electric Co., Kearny, N. J. with which company he now is identified

* H. A. Nelson, Ind. Eng. Chem. 27, 1149 (1935).

** H. J. Wing, Ind. Eng. Chem. 28, 242 (1936).

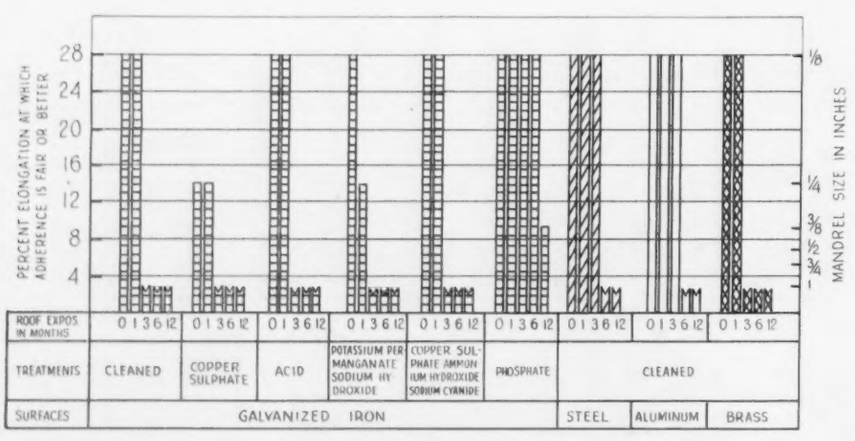

Chart 1—This diagram shows test results obtained on galvanized iron surfaces prepared by various methods and over periods of time up to 12 months. For comparison, similar test results are shown on plain steel, brass and aluminum surfaces. Finish applied was one coat of primer, plus two of paint paint

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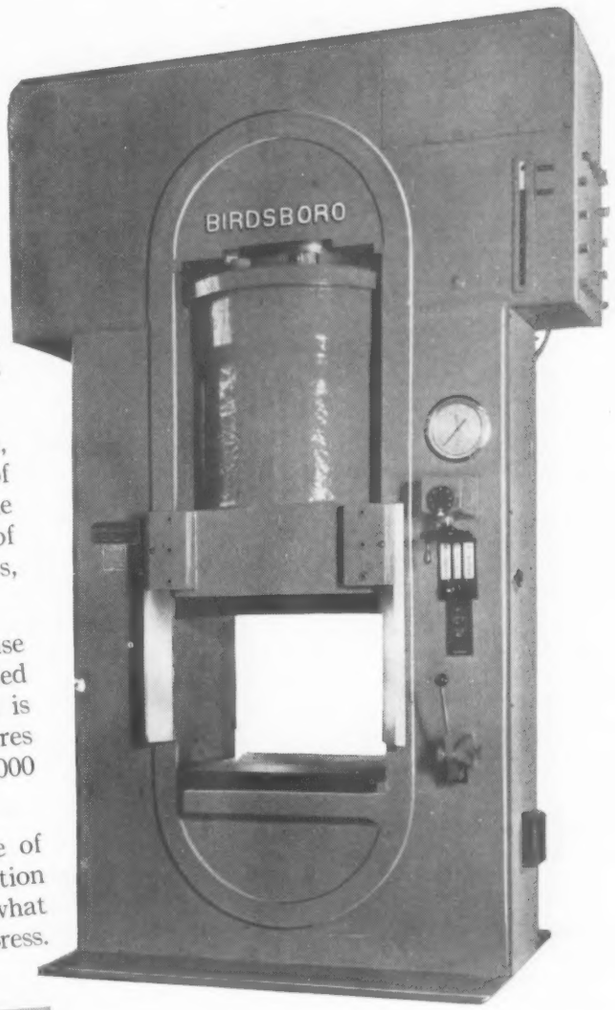

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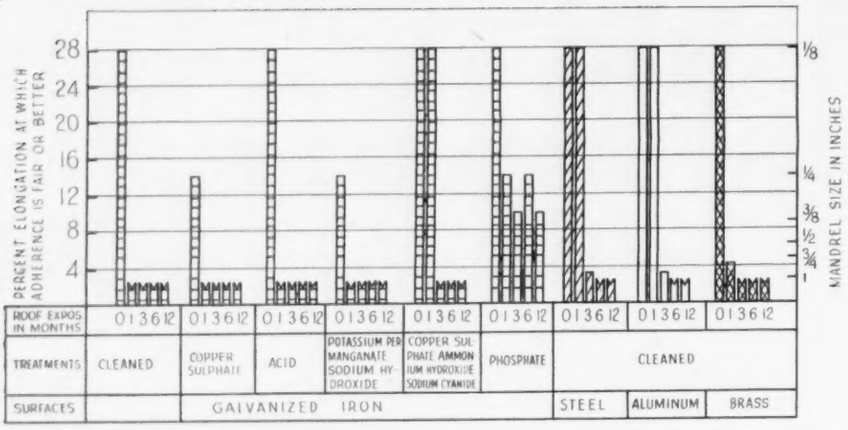


Chart 2—Similar tests to those shown in Chart 1 except that here the finish applied consisted of two coats of pigmented lacquer. In all cases, adherence was determined by a mandrel test

stable nature which is nonreactive to either the zinc or the organic finish, as well as being physically suited for providing the best adherence of the applied finish. The most logical and practical means of providing a good surface would appear to be to treat the zinc surface by immersing it in a chemical solution which would react with the zinc or zinc coating to form a complete, nonporous and stable compound suitable for the application of organic finishes.

To obtain this special surface condition at the interface, it first is necessary to prepare properly the articles of manufacture prior to the immersion treatment. To insure satisfactory action of the chemical treatment, all zinc parts must be cleaned thoroughly of grease and dirt. Equal parts of solvent naphtha and acetone have proven satisfactory for this purpose. However, wash treatments, acid dips, electrolytic cleaning and vapor degreasing also are suitable for the purpose.

The immersion treatment should be applied immediately after cleaning to avoid any contamination or oxidation of the surface. The period of immersion will depend upon the chemical solution and the physical structure of the zinc surface. It is important that a complete and uniform coating result from the reaction. The presence of grease or any other foreign matter will show up as a variation in the coloring on the converted zinc surface or by the presence of bare areas which are not acted upon in the treatment.

Many treatments have been applied to zinc coatings from time to time to improve the adherence of subsequently applied organic finishes without much success. However, due to constant research, commercial materials now are available which give satisfactory results.

Unquestionably, a particular treatment will not give the same improvement in the adherence of a subsequently applied organic finish on all types of zinc surfaces such as galvanized iron, sheet zinc, electroplated zinc, etc. Nevertheless, it can be stated that the improvement in adherence on zinc surfaces prepared with certain treatments commercially available will be sufficient to satisfy effectively present commercial demands.

Charts Show Adherence

To demonstrate this and the varied results in adherence that may be obtained with various treatments, Charts 1, 2 and 3 have been provided to show the retention in adherence of paints, lacquers and synthetic enamels when applied over a zinc surface (in this case galvanized iron) which has been treated with a number of immersion treatments. In addition, Chart 4 shows the improvement in adherence of organic coatings obtained by the use of a phosphate treatment on many types of zinc surfaces. Adhesion values of the same finishes applied to steel, aluminum and brass have been included in each table for comparison with corresponding data on the various zinc surfaces.

A mandrel test was employed in evaluating adherence as it provides a good indication of the adherence of a finish to its base surface. Mandrel diameters ranged from ⅛ to 1 inch. Degree of adherence was determined by scratching the finish on the bent area of the test strip with the finger nail. Elongation of the organic film obtained by this test ranges from 3 to 28 per cent. Failure to pass the test on the 1-inch mandrel (3 per cent elongation) is indicated in the charts by a break in the segment representing the various finishes. Those which have an elongation of 28 per cent (⅛-inch mandrel) have reached the mechanical limitation of the mandrel test. All test panels were subjected to outdoor exposure at 45 degrees facing south, with additional periods of artificial rain. The finishes were tested at initial, 1, 3, 6 and 12-month aging periods.

Experiments Verify Experience

Phosphate treated galvanized iron offers an excellent surface for the adherence of paint (Chart 1). The phosphate treatment used is a commercially available process consisting of an immersion in a chemical solution which is maintained at an elevated temperature, followed by a cold and hot water rinse. The completion of the reaction is indicated by the discontinuation of gassing which, in general, occurs in less than one minute. The finishes applied over other treatments, such as the acid and the potassium permanganate-sodium hydroxide immersions, retained good adherence for a short period of time and then lost it almost entirely. This experimental work verifies the actual experience of manufacturers today when they use these or other sim-

Chart 3—This shows results of adherence tests when the finish applied consisted of two coats of synthetic baking enamel. Note improvement compared with Charts 1 and 2

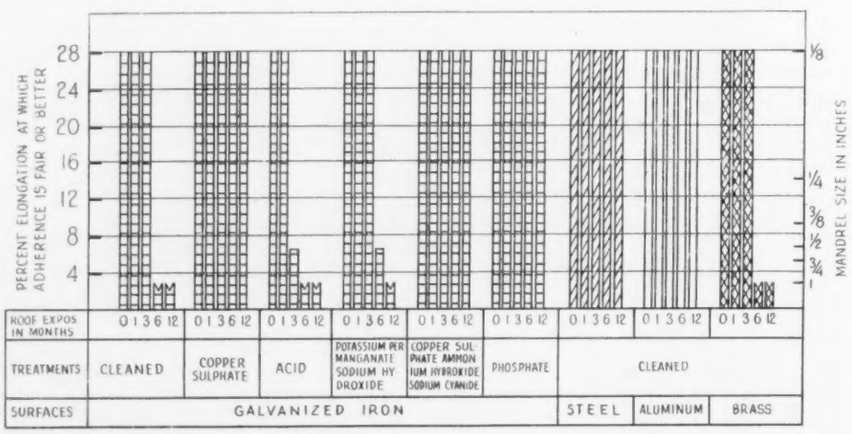
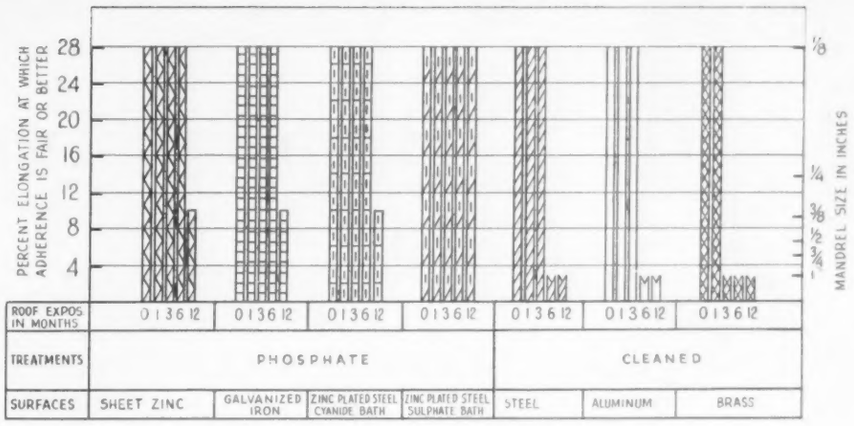


Chart 4—This is shown for comparison. It shows excellent adherence obtained with phosphate treatment when combined with a finish consisting of a primer coat and two coats of paint



ilar unsatisfactory finishing methods.

The order of adherence of several finishes to phosphated zinc surfaces is evidently about the same as to cleaned steel. However, one should not be misled at this point into believing that the finish has flaked off or peeled when the table indicates an adherence which is unsatisfactory at the 1-inch mandrel. The fact is that the finish may still be intact on the surface, with the exception of cracking, but when tested it would show poor adherence to the metal surface. This indicates a definite loss of adhesion, but not to such an extent as to cause appearance failure in service.

Results similar to those shown with paint are generally indicated when a typical pigmented lacquer and synthetic baking enamel are applied over treated and untreated metal surfaces, with the exception that the synthetic baking enamel appears to retain its adherence for a longer period (see Charts 2 and 3). The retention in adherence of the baking enamel finish may be due to the greater cohesive forces that it possesses compared to that of other types of finishes.

Phosphate Treatment

The phosphate treatment provides for the best finish adherence on any type of zinc surface. The results in Chart 4 clearly indicate the progress which has been made in the length of time that good adherence can be retained by the use of this type of treatment.

For use over phosphate treated zinc and in general over any metal surface, the baked synthetic-enamel finish is most desirable. It has been found by various investigators that the baking synthetic enamels as a class are superior in adherence to the other types of materials. In addition, a more wear resistant, tougher, flexible and weather-resistant coating is obtained as a result of the polymerization of the film by the heat applied in the baking operation. These properties, which this class of materials possess after baking, unquestionably increase the life of a finish on a properly prepared zinc surface. The results of a baking synthetic enamel on phosphate-treated zinc, as shown in Chart 3, affirm this fact.

However, for baked finishes on zinc alloys, it is suggested that the temperature of bake be limited to a maximum of 380 degrees Fahr. since any temperature above this limit will cause a change in the structure of the alloys, thereby changing the physical properties of the metal. Also, in the case of zinc die castings, excessive temperatures will cause pimpling and blistering of the surface due to entrapped gases.

In conclusion the author wishes to emphasize that life of a finish depends primarily on two conditions when applied to products fabricated of zinc: The proper preparation of the surface to insure the most satisfactory anchorage for the organic film, and the use of finishing materials which are inherently flexible, adherent and highly resistant to exposure.

Satin Finish on Stainless Steel

■ According to *Metal Industry*, satin finishes on metals are most readily obtained by buffing with a greaseless buffing compound applied to a soft buffing wheel, usually a loose muslin buff. The texture of the finish can be varied by the grade (or grit size) of the greaseless compound and also by the softness and surface speed of the buffing wheel used.

On articles made from stainless steel sheet or strip metal, a satin finish can be produced in one operation by the use of a No. 180 or No. 220 grit greaseless buffing compound on a 64/68 loose muslin buff at 4000 to 4500 surface feet per minute.

On nickel plated articles, it is generally best to produce the satin finish in two steps. The first operation is performed on the basis metal in the same manner as described above for stainless steel. The article is given a fairly heavy nickel deposit, say 0.0005-inch and then given a second greaseless compound operation using a finer grit compound and a softer buff, such as a 1 to 1 packed muslin buff at about 4000 surface feet per minute.

Baking Enamel Simulates Metal Finish

■ To reproduce colors of metals, a new baking enamel known as "Baking Platelustre," has been developed by Maas & Waldstein Co., 438 Riverside avenue, Newark, N. J. Any polished metal, according to the manufacturer, can be made to resemble brass, chemically treated aluminum and steel, and other colored metals. The enamel is durable when baked and will resist action of cleaning operations and plating baths.

When applied sectionally, a wide variety of effects is possible. Flat stock finished with this enamel can be formed after baking, and two-color finishes can be obtained by "relieving" operations. It can be applied to any kind of polished metal by spraying or roller coating and is especially suitable for compacts, novelties, lighting fixtures and other products where a brilliantly colored metallic finish is wanted.

Commodity Yearbook

■ *Commodity Year Book*, 1939, cloth, 624 pages, 8½ x 11 inches; published by Commodity Research Bureau Inc., New York; supplied by STEEL, Cleveland, for $7.50; in Europe by Penton Publishing Co. Ltd., Caxton House, London S.W.1.

In this volume is combined an all-inclusive statistical reference work, a raw material encyclopedia and nine important fact-finding studies of commodities. The special studies cover such topics as government activities in commodities; relationship of stock prices to commodity prices; foreign exchange movements and commodity prices; war and commodity prices; United States balance of trade; international production control; per capita consumption and population trends. It is planned to make this an annual publication, the next number coming out early in 1940.

High-Pressure Pump

Made commercially possible by use of modern alloy steels, new type of extreme-pressure portable cementing pump features many interesting departures from conventional practice

By **WM. D. OWSLEY**
Designing Engineer
Halliburton Oil Well
Cementing Co.
Duncan, Okla.

■ TO PREVENT water from entering into oil pumped from oil wells, a procedure has been developed for shutting off the water by cementing the well. For this work, portable pumps operating at pressures up to 3000 pounds per square inch are suitable for shallow wells. However, deep wells require pressures up to 6000 pounds per square inch or more. Construction of such a pump of sufficiently small size and weight as to be portable was deemed impossible just a short time ago. However with new high-strength alloy steels, more than 30 pumps as described below have been built and are in successful operation.

This pump is a duplex double-acting vertical unit with 4½-inch bore and a 10-inch stroke. It is designed to be mounted on a truck and driven by the truck engine through a torque tube from truck transmission. Crankshaft of the pump is driven with cone worm gears in which the ring gear is mounted between the crank throws on a steel web. The worm is hung beneath the ring gear in an enclosed oil bath. Gear ratio is 18½ to 1. Use of truck transmission eliminates necessity for countershaft to produce desired reduction between engine and pump crankshaft.

Working pressure of the pump with 4½-inch pistons is 6000 pounds per square inch at 12 to 14 revolutions per minute with the ability to carry 10 to 15 per cent overload. Normal horsepower input is 110. Weight of unit fitted ready for installation is 4350 pounds and ratio of pump weight to maximum output pressure is 0.725.

The vertical construction of the pump with power end below the fluid end is somewhat radical and quite different than usual practice. However, it permits setting the pump between the chassis rails of the truck, which are 30 inches apart. This produces a low center of gravity and eliminates sidesway due to inertia of moving parts.

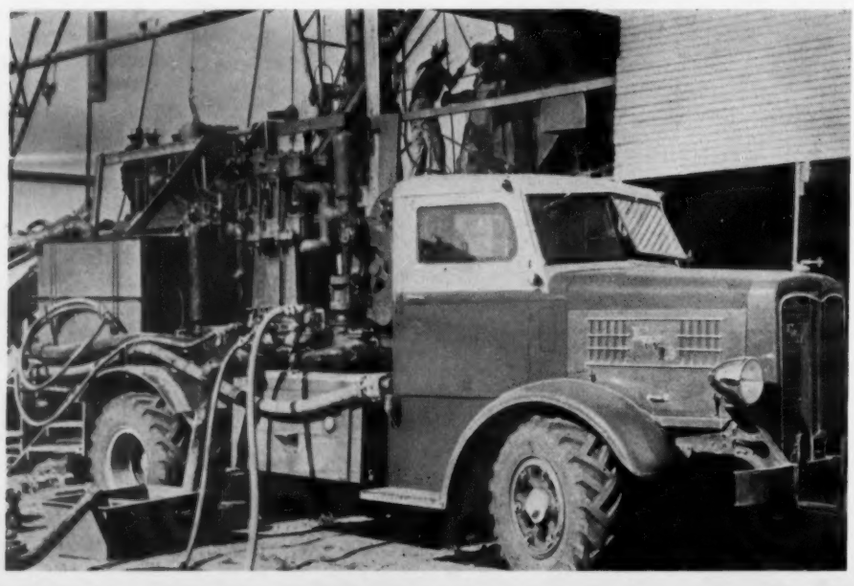
Crankshaft is carried on two main bearings of the spherical roller self-aligning type with thrust end of shaft held in position by self-aligning roller thrust bearing. Worm shaft is carried on a pair of angular contact ball bearings with opposite end of shaft supported on straight roller bearings. Worm bearings are grease packed and segregated from lubricating oil in the crankcase proper.

Portable operation demands lowest possible weight for the entire unit. Type of service necessitates use of extremely high pressures, yet ability to carry considerable amount of fluid under varying pressures. Capacity of pump at zero discharge pressure and at 110 revolutions per minute is 340 barrels per hour. At 6000 pounds per square inch, capacity is 40 barrels per hour. Fluids handled by this pump include water, crude oil, rotary drilling mud containing. high amounts of abrasive material and neat cement slurry.

Cylinders Entirely Removable

Cylinders in the fluid end are made entirely removable instead of using liners as is the more customary practice. This feature eliminates considerable difficulty from having the liners become cemented into place from high-pressure operation. Lubrication is by continuous-flow force-feed system from an oil-filled enclosing crankcase.

Material featured throughout the machine for all heavy sections is cast alloy steel, carefully heat treated. The power and base sections, fluid end, worm housing and main bearing covers were produced from SAE 4335 steel. Heat treat-



Truck-mounted pump handles 40 barrels of water, crude oil, rotary drilling mud, or cement slurry at pressure of 6000 pounds per square inch. Normal horsepower input is 110. Photo courtesy International Nickel Co. Inc., New York

ment for these parts included normalization and drawing at 1200 degrees Fahr. in the rough cast condition with no additional heat treating.

The physical tests on this steel show minimum tensile strength of 110,000 pounds per square inch, a yield point of 80,000 pounds per square inch, elongation of 18 per cent and reduction in area of 44 per cent.

In addition, this material possesses high strength, fair machinability, good grain structure, excellent rigidity, and also exhibits great resistance to abrasion and corrosion in the fluid end. In common with other high alloy steels, this material is rather difficult to pour, but the castings from it have been consistently sound.

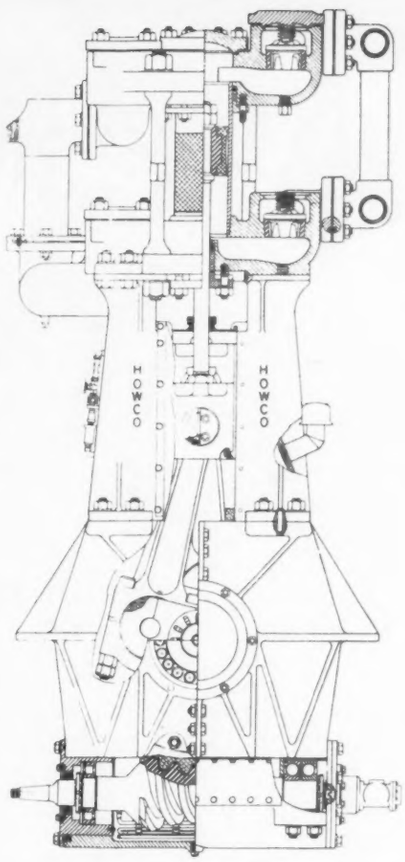
Crankshaft, connecting rods and crossheads are also of SAE 4335 steel, the material being normalized, oil quenched and tempered at 1100 degrees Fahr. to show minimum tensile strength of 130,000 pounds per square inch, a yield point of 110,000 pounds per square inch with 18 per cent elongation and 45 per cent reduction in area. These parts are highly stressed and so must have exceptional strength to carry the loads imposed. In addition the crankshaft must carry a high finish on the journals and crank throws. All steel castings used in these units were produced by Oklahoma Steel Castings Co., Tulsa, Okla.

Wear Hardening Surfaces on Guides

The crosshead guides are made from steel of approximately SAE 4635 range. These parts are normalized and drawn at 1200 degrees Fahr. Minimum physicals include a tensile strength of 100,000 pounds per square inch, a yield point of 70,000 pounds per square inch, 23 per cent elongation and a 50 per cent reduction in area. This material was selected for its ability to take a good bearing surface finish. It is given a light shear tool cut on a boring mill in the circular bore forming the guiding surface for the crosshead shoes, thus eliminating a difficult grinding operation. Also this alloy has good resistance to galling under high bearing loads. In addition the working surfaces are wear hardening. This latter is important in this extremely severe service.

Crosshead pins are SAE 4615 steel produced from certified alloy bar stock in the annealed condition. Subsequently they are case hardened in a pot to between 60 and 65 on the Rockwell C scale. This is followed by heat treating to produce a highly refined tough core. Surface is ground for final finish.

The removable cylinder is produced from the same metal as crosshead pins, type SAE 4615 steel. Here



Sectionalized view of new extreme-pressure pump described here

it is carburized internally only. This is followed by heat treatment for core refinement. Surfaces then are ground and honed for final finish.

The tie rods for fluid end are turned from bar stock using either Crucible Steel Co.'s Maxel 3½ or Ryerson Rycrome, both heat treated to give about 150,000 pounds per square inch tensile strength, a yield point of 118,000 pounds per square inch and a hardness of 32 Rockwell C.

All studding material is SAE 4140. This is heat treated to Class C bolting specifications with minimum yield point of 105,000 pounds per square inch. Nuts used are 0.40 per cent carbon, oil quenched.

Connecting rod crank bearings are of the steel-backed automotive type. Bearings are lined with a nickel-cadmium alloy known as Asarcoloy No. 7, produced by Cleveland Graphite Bronze Co., 880 East Seventy-second street, Cleveland. This material has a low coefficient of friction combined with the ability to carry extremely high bearing loads without running or seizing. Pin end of connecting rod is bushed with Chrysler Oilite bronze bushings.

Crosshead shoes are made of Progressaloy No. 90, an extremely tough wear-resistant bronze produced by Progressive Brass Co., Tulsa, Okla. The ring gear is made of SAE 65 bronze with 1½ per cent nickel added. This material furnishes an excellent bearing surface and also is work hardening. The worm is forged steel Hy-Ten-B-3X, heat treated to about 35 Rockwell C.

The piston rods are of high-tensile nickel-alloy steel in a carburizing grade. After material is carburized, it is ground to finish.

Use of high-strength alloy steels in well-designed sections has made possible the production of this pumping unit. Only a few years ago, such a unit was considered practically an impossibility. At present the Halliburton Oil Well Cementing Co., designers and builders of this machine, have 32 of these pumps in use. To date there has never been a failure in any casting or other important part of any of these machines, the oldest of which has been in service nearly two years.

Silicon Bronze Alloy For Cold-Headed Parts

■ A new high-copper silicon bronze known as Duronze V has been developed by Bridgeport Brass Co., Bridgeport, Conn., for use in cold-headed parts with extremely large heads. The alloy is claimed to be more ductile than brass, to have less tendency to become overworked than brass wire and not to be subject to season or corrosion cracking.

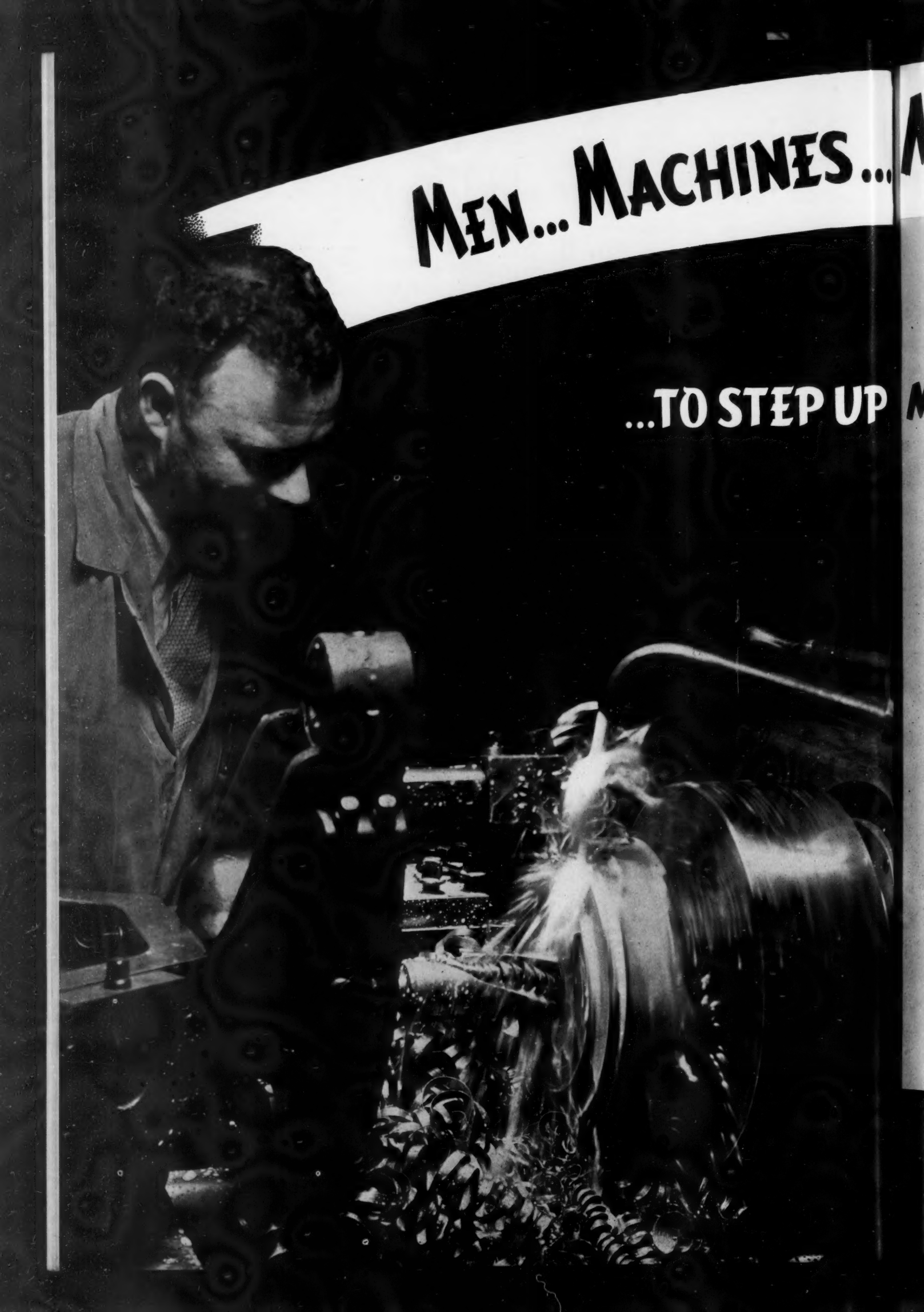
Its properties are: Electrical conductivity, compared to copper, 9.0 per cent; density, 0.313 pounds per cubic inch; modulus of elasticity, 15,000,000; coefficient of thermal expansion per degree Fahr., 0.0000093.

In tube form, it also is being used for overhead catenary construction in the electrified railway field. Having approximately twice the strength of copper and possessing fine corrosion resistance, the alloy also is recommended by the manufacturers for use in electrical conduit where conditions are too severe for steel or copper.

Extruded Ampco Metal

■ Ampco Metal Inc., 3830 West Burnham street, Milwaukee, announce that Ampco metal now is available in extruded and drawn form, with improved physical properties and wear resistance.

The new extruded and drawn rod is a modified grade 16 alloy, meeting requirements of federal specification QQ-B-666, Class B, and navy specification 46B17b, Class B. This new rod is stocked in 1/16-inch diameter to 2-inch diameter by 10 to 12 feet long. Outside of this size range, Ampco hot-rolled rod usually is used.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Unit Heaters Show Cost Reduction of 53 Per Cent

By HARRY W. SMITH Jr.*

■ MODERNIZING plant heating facilities at Haughton Elevator Co., Toledo, O., has not only improved general working conditions but has made important savings in heating costs.

In the 76,000-square-foot single-room structure housing all manufacturing operations at this plant, 41 gas-fired unit heaters have made possible a 53 per cent saving in fuel and maintenance costs. The building is a wood and steel structure 358 feet long, 215 feet wide with a lengthwise central monitor bay or main craneway 33 feet high and 52 feet across. East and west bays on either side are 17 feet high.

Roofs are flat except one saw-tooth running the full length of each side bay to provide for 12-foot near-vertical skylights. Roof consists of pine sheathing covered with composition roofing. Sidewalls of monitor bay are vertical and all glass. Other walls are brick for the first 4 feet from the ground and glass with about 5 per cent of wood and siding for the remaining distance.

Floor in west bay consists of 10 inches of concrete and in the east bay are 9 inches of concrete with 3 inches of wood on top. Flooring in monitor bay is 12 inches of concrete topped with ½-inch of sand and 3-inch wood block. Thus it is apparent that the spaces involved in the plant are large and that thermal insulation is poor.

Before the unit heaters were installed, the structure was heated by ten batteries of old duplex coal furnaces with individual blowers and horizontal warm-air outlets about 8 feet above the floor. Cost records show this equipment involved operation and maintenance charges of from $4600 to $4750 per year. Coal cost, plus freight, plus unloading ranged between $3300 and $3400. Items for labor and power for coal handling, plus firing, plus ash removal, plus power for blowers totaled $700 to $750. Repairs and maintenance were $600.

In addition, the heating was unsatisfactory as it was too warm near the heaters and too cold at any distance from them. An even temperature throughout the plant was impossible to obtain.

To improve this situation several factory heating systems were considered. That which at first indicated the lowest operating cost was a large coal-fired boiler installation supplying a hot-water unit heater system. Such equipment and installation would have cost $35,000. However, it was disclosed that if $7000 was spent in insulating the roof with 4 inches of fiber glass insulating wool, the maximum heat loss would be reduced to between 4 and 4½ million B.t.u. per hour, and a $10,000 installation of gas-fired unit heaters would be able to operate at as low an operating cost as the more expensive coal boiler installation.

Accordingly, some 80,000 square feet of roof and monitor end walls were insulated with five carloads of 4-inch fiber glass wool in bats 15 x 36 inches. In addition to reducing the heat losses, this material was found to cut shop noise, due chiefly to lineshafting, to about half its former amount. In addition, working conditions were perceptibly cooler during the summer months. With the insulated roof and directed air circulation created by operation of the unit-heater fans and louvres, summer temperatures were lower in the plant than in the adjoining office building.

Uniform Heating Obtained

The 41 unit heaters are spotted judiciously throughout the entire plant. Each of 19 units consumes hourly 81 cubic feet of natural gas rated 1050 B.t.u. per cubic foot. Each of 13 units consumes 152 cubic feet, the other 9 using 190 cubic feet. All heaters are suspended approximately 7 to 8 feet above the floor with louvers directed downward. Absolute uniform heating of the room is obtained, a test made on a typical cold December day showing a temperature variation from floor to crane bay ceiling of less than 5 degrees Fahr.

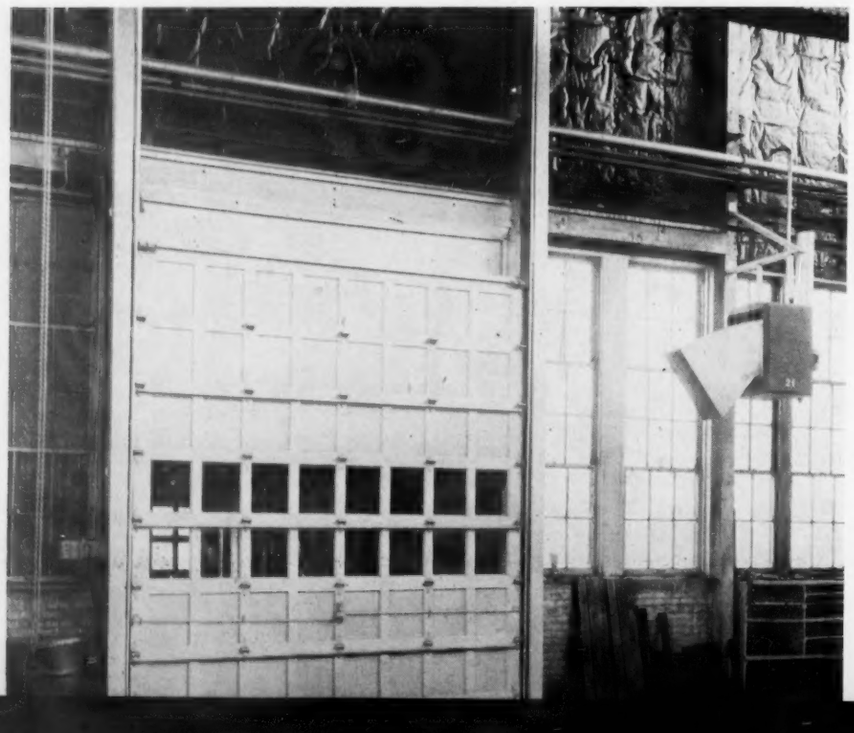
Typical of some of the special installations made of the unit heaters is that shown in accompanying illustration. This unit is located above and beside the inner and vertical lifting door of the truck vestibule. Equipped with a fan-shaped high-velocity nozzle, this unit plays a sheet of warm air across the large truck door opening when it is in use, thus forming a warm-air screen against excessive cold air infiltration.

Each of the 41 heaters is individually controlled by a thermostat located 5 feet from the floor and almost directly below. Each unit is equipped with a device which will not permit the gas to be turned on until the fan is running so failure of the fan circuit power cannot cause overheating of the unit. The entire installation was made without interrupting factory operations.

Most noteworthy of all is that the actual gas bills received from Oct. 28, 1938 to June 8, 1939 totaled only $2095. This amount was only 47 per cent of the previous year's bill. While part of this difference might have been due to the rather moderate winter experienced, the rest was due to decreased building heat losses through application of the insulation and the increased heating efficiency of the unit heaters.

*Industrial Gas Section, American Gas association, 420 Lexington avenue, New York.

Unit heater inside inner truck vestibule door plays a sheet of warm air to form screen against excessive cold air infiltration when trucks come and go



Germany Smelts Low-Grade Ores In New Stacks At Goering Works

(*Continued from Page* 42)

ton tilting open hearths and an electric steelworks having a capacity of 2,500,000 tons annually. Rolling facilities are to include blooming, billet and finishing mills; projected are rail, structural and two strip mills. One-half of the first group of blast furnaces, namely four, are completed and the other four are under construction. Particular attention has been paid to obtaining straight-line flow of materials.

The blast furnaces are laid out in groups of eight. Four stacks, 20 to 23 x 100 feet, are built in line on either side of an ore storage yard. Of the first group of stacks, four are completed and four are under construction. They are designed along the lines of the Corby furnaces in England. Each stack is served by three 22 x 100-foot stoves. Double-compartment recuperators are a part of each stove installation. On account of the volume of cinder being about three times that of American practice, each stack is provided with two cinder notches. Furnace columns are placed on a slant to provide for hearth enlargement should conditions in the future warrant. The ore for these furnaces is brought from the Baltic by way of the Midland canal nearby.

Gas Piped To Berlin

At the Braunschweig plant of the Reichswerk five 60-ton converters are installed having a combined capacity of 2,500,000 tons output annually. These approach a spherical shape at the bottom and are cylindrical up to the mouth. Rolling facilities at this plant include a blooming, 22-inch reversing and a 26-inch continuous mill in which every other stand is a vertical stand. The buildings housing the various departments of this plant are said to be the largest ever built in the world. Gas from the coke ovens at this plant is piped 180 miles to Berlin in one direction, and in the other, to Hanover where it is mixed with the supply coming from the Ruhr district.

At the Lintz plant on the Danube there are three stacks with 20-foot and three with 23-foot hearths. Capacity of these works is about one million tons yearly.

Following Mr. Brassert's address, separate meetings were held by members of the blast furnace and coke oven sections respectively. At the blast furnace meeting G. W. Hewitt, director raw materials, Wheeling Steel Corp., Wheeling, W. Va., presented a paper on "Comparative Values of Iron Ores at the Blast Furnace."

A paper on "The Influence of the Past Upon the Coke Oven of Today," presented by Dr. Carl Otto, Otto Construction Corp., 74 Trinity place, New York, before the afternoon session of the coke oven section, gave coke oven history from the first oven through the nozzle and underjet system to the entire underjet system now being built which distributes not only rich gas, but lean gas and air as well, and keeps pressure and differential in pressure to a minimum.

He also pointed out the difficulties overcome by the modern improved hairpin oven with single regenerators with gas distributing pipes embedded in the concrete beneath the oven. The mat absorbs heat from the regenerators located above and the gas in the steel distributing pipes is automatically preheated and kept constantly at about 170 degrees Fahr. This temperature is well above the dew point and prevents deposits inside the nozzles.

To emphasize the advantage of the Otto entire underjet system in conjunction with the normal low differential hairpin oven, Dr. Otto gave the temperature of 86 degrees Fahr. in the cellars of an entire underjet system compared to the 106 degrees Fahr. under the normal underjet oven. This temperature can be kept lower in the entire underjet system without influencing deposits in pipes. Heat consumption using blast furnace gas showed a difference of 9 per cent in favor of the improved type of entire underjet oven.

Pressures Reduced

According to Dr. Otto, results indicate that the distribution of air through steel nozzles will result in a still greater reduction in pressure in the low-differential oven. The improved construction reduced the number of obstacles that develop resistance inside the brickwork of the oven. There are no regulating devices inside the new entire underjet ovens and from results obtained thus far, the speaker said it is reasonable to conclude this oven is the lowest of all in differential pressure at present.

Dr. Otto mentioned that since 1926 his company has built 7000 hairpin underjet ovens outside of America in various parts of the world, with a carbonizing capacity of 56,000,000 net tons of coal per year.

In closing, Dr. Otto said that coke oven progress in Europe has been greatly stimulated by the intense competition and keen rivalry that has always existed between coke oven engineers and constructors. He also complimented the colliery owners, steel masters and business leaders in Europe for their liberal cooperation and understanding of these problems.

In discussion, it was brought out that this country would greatly benefit also if more competition and rivalry were existent among the same group.

Fred Denig, vice president, the Koppers Co., Koppers Building, Pittsburgh, in speaking on the "Present Trend in Coal By-Products," began point-blank by saying the industry in recent years has not shown any willingness to develop new products or improve on the old ones. He then pointed out that the path of greater returns for by-products lies in the direction of improving the product and developing new ones by systematic research as well as reducing labor and heating costs.

Shortage of Toluol

If the present war in Europe continues Mr. Denig predicted a shortage of toluol as soon as heavy buying begins, but that there would not be the same shortage of dyestuffs and other coal-tar products as experienced in 1917-18 because of the greatly increased capacity for producing coal-tar products. Production of toluol products recently has made a sharp rise in England. He also advised distillers to keep their eye on light oil, as this product may again become important, and for the paraffine content to be watched since an amount greater than 1 per cent may make the oil unsuitable.

Mr. Denig brought out the paradox that, although over 300 products may be extracted from coal tar, there are only a few where this is commercially possible, among these being naphthalene and tar acids which make but 10 to 12 per cent of the tar recoverable. He said it would be necessary for tar producers to lower the cost of coal tar in order to make extraction of more products commercially possible. Pyridine is becoming increasingly important due to the discovery of the medicinal value of sulfapyridine and its production should be seriously considered. Roofing pitches for steep roofs, wood preserving compounds, and road tar are also of increasing importance.

The petroleum industry, the speaker contended, is beginning to invade the markets enjoyed by the

coal tar industry, especially in aromatic chemicals. This has been brought about, he stated in closing, by the active research programs in the petroleum industry. To combat this, the by-product industry should adopt the same weapon—research.

In the ensuing discussion the recovery of pyridine was reported as making attractive returns. It was also brought out that the great fault of the industry was its supine attitude in allowing the buyers to indicate what they want. A definite research program would reverse the situation and present the products to the buyers. In this connection it was pointed out that steel mill coke ovens produce only what they are forced to produce, that by-products will remain secondary.

Health of Worker Is Given Study

■ WORKMEN, as represented by the American Federation of Labor, will continue to fight for compensation for all workers for all disability and diseases, and will continue to co-operate with employers to reduce industrial accidents and diseases, according to R. J. Watt, international labor representative of the federation. Mr. Watt addressed about 200 members and guests of the Air Hygiene Foundation at its fourth annual fall meeting, held in Pittsburgh, Nov. 14-15.

Mr. Watt also stated that organized labor advocated public control of all compensation and opposed offerings of private insurance companies along this line, on the grounds that profit should not be taken from such an enterprise. He was rebutted in this argument by J. Dorsett, Association of Casualty & Surety Executives, who stated that larger benefits were being paid out per dollar cost of private plans as against those states which have monopoly control through state operation of the benefit fund.

Report of the preventive engineering committee of the foundation was given by Philip Drinker, Harvard university, chairman. Prof. Drinker described work in determining which are the most dangerous sizes of silica particles, in order to design more effective respirators for eliminating these sizes. As a corollary, the committee is investigating improved designs for respirators and air washers.

A second research now under way at Harvard involves design of electroplating tanks, baths, vats using toxic solvents and liquids for elimination of dangerous fumes.

New legislation providing compensation to workers for occupational diseases resulting in injury have been enacted over the past year by Arkansas, Idaho and Maryland, bringing the total to 24 states having such statutes. In five other states reports will be presented to the legislatures during the coming year, according to the report prepared by T. C. Waters, legal committee of the foundation and chairman, Maryland Occupational Diseases commission.

Medical research has been continued by the foundation, according to Dr. A. J. Lanza, chairman of the medical committee. Dr. L. U. Gardner has directed studies of rock dusts at the Saranac laboratory, and some 150 samples of rock from 14 industries have been classified. Effects of various dusts on tissues have also been studied, and new experiments started to determine whether some individuals are more likely to contract silicosis than others, and, if so, whether this characteristic can be determined in pre-employment examinations.

Dr. S. R. Warren Jr., assistant director, X-ray laboratory, University of Pennsylvania, discussed work on methods used in examining the chest for diagnosis of silicosis and other dust diseases. Dr. E. R. Clark, professor of anatomy, University of Pennsylvania School of Medicine, announced the results of research into the actual effects of silica on living tissues.

Dr. Lanza presided over a symposium on sick absenteeism in industry, its extent, causes and control, which included discussion by representatives of a wide variety of industries. One of the most practical studies to date was given by Andrew Fletcher, vice president, St. Joseph Lead Co., in which he stated the employer's viewpoint on industrial health, reinforcing the talk with figures showing cost to the employer, citing case histories and giving figures representing the loss to his company caused by industrial diseases.

Force of employe health on public relations and on relations with employes was discussed in a forum following.

Unconventional Machining Often Is Practical

(*Continued from Page* 51)

initely in the picture as a means for roughing out and finishing threads under everyday production conditions. This list of unconventional methods which have become entirely conventional could be extended to great length.

Let us now take a look at just a few of the comparatively recent developments which in some circles may still be considered a bit unconventional today but which tomorrow undoubtedly will be generally recognized as common practice. Oftentimes such developments represent a renaissance of an older method in a new field. Such is the case of band sawing. Originally developed as a woodworking process, it achieved recognition in that field nearly 100 years ago. Then, many years later, with the development of better blades and more powerful machines for using them, the use of band saws was extended successfully into the field of metal cutting-off machinery. In the meantime vertical band sawing machines had been introduced into patternshops, where it was discovered that they could be used effectively in form sawing soft metal as well as wooden pattern parts.

The final step was the introduction of highly refined, accurate, rigid and powerful vertical band sawing machines capable of cutting the harder and tougher metals—including steel. It was then that they definitely took their place in the machine tool family—a place in which these machines are still finding new and surprising uses under real production conditions.

One example of the capabilities of these machines is given by Fig. 1, which shows the layout of the steel blank and the part produced therefrom on a Doall internal and external contour sawing and filing machine, through use of a metal cutting band saw blade. Only twenty of these poppet valve levers were required. Forging dies for that number were of course out of the question, while machining them out of the solid by "conventional" methods undoubtedly would have been both difficult and costly. Contour sawing solved this problem very neatly, the time per piece under this method being approximately three hours per piece.

The setup involved in Fig. 2 represents only one stage in an unconventional system of parts production—the more complete description of which we hope to cover in a later article. This setup is in the new Kearney & Trecker rotary head tool and die milling machine, a machine designed especially to carry out with speed and precision under ex-

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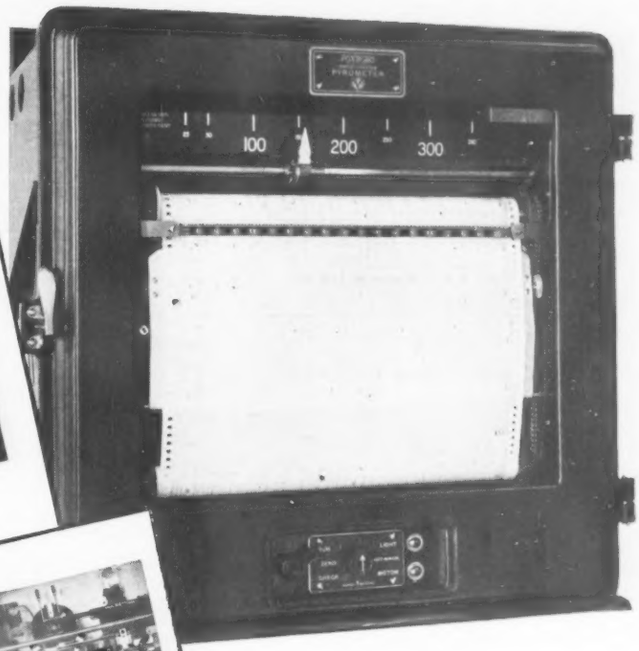

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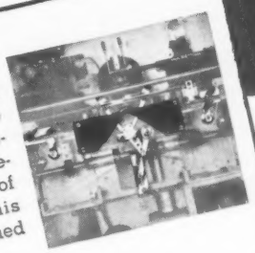

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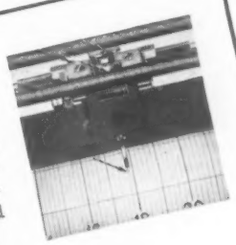

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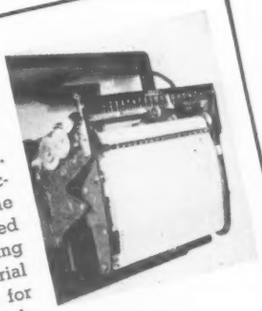
The entire mechanism can be pulled forward out of the case and every moving part can be removed or replaced by an inexperienced operator standing squarely in front of the case. In addition to making every part accessible, this construction allows the use of anti-vibration rubber cushioned mountings within the case, assuring good performance under all industrial conditions. Routine adjustments for standardizing the circuit are made without opening the door.



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act mechanical control, the intricate work involved in sinking a three-dimensional die.

In this particular case however, the machine is doing exactly the reverse of sinking a die. It is machining on a solid steel block a former which is exactly the shape of the opening in one of the die blocks in which a connecting rod is to be forged. This "former," which is 9 inches long, was produced at one setup in 41 man hours.

While this part itself is interesting, the use to which it is put is still more so. After hardening, it is used under heavy pressure as a former for the making of the actual dies used for forging connecting rods—these dies literally being "embossed" in solid steel blocks by this method. In this manner the one master former serves to produce a large number of dies at very low unit cost.

The engine lathe is of course one of the more versatile machine tools but not until lately has it been thought of as having possibilities on work such as that depicted in Fig. 3. This is an 18 by 48-inch Monarch-Keller lathe equipped with the Kelley shape-turning device, which definitely puts the engine lathe into the field of die sinking and mold forming. With the help of the Keller and Kelley attachments, the single point tool can be made to follow various irregular contours, thereby making it possible to turn, bore and face to various irregular designs of which the one shown is a good example.

Turning With a Die Head

In Fig. 3 we see a turning operation being performed by an adaptation of a special tool which originally was developed for production threading. The basis of this tool is a National Acme circular chaser type opening die head. The threading chasers however have been replaced by circular forming tools which serve to prepare the ends of upset tubing for the subsequent threading operation. It is interesting to note that the circular chasers which will cut the threads are themselves a development of the circular forming tool—and have the 270 degrees or so of useful "body" which characterize these circular tools.

Then again we find the milling process being applied successfully to what ordinarily would be a turning operation. Fig. 4 depicts the practical use of the Rotomill in the machining of transmission clutch gear blanks. Through the use of two powerfully driven and mutually balancing clusters of large diameter revolving milling cutters, these steel forgings are roughed out to relatively close limits after the cutters have fed in to depth and the work itself has revolved on centers through 370 degrees. Total machine time per piece in this case is 23 seconds—1 pound, 13 ounces of tough metal being removed within that brief period.

In view of the quick removal of this considerable quantity of metal it is a rather surprising circumstance that the work itself is warmed only slightly. The chips—which are like short sections of small, straight tightly curled tubing—show little or no heat discoloration and the cutters also remain cool. Each tooth is engaged only for a very short period and coolant flow of 100 gallons per minute promptly sweeps away the heat along with the chips.

U. S. Investment Stake In Canada Four Billions

(*Concluded from Page* 45)

ments are imported. Deposits are poorly situated in regard to principal consuming centers in Ontario and Quebec, which are more easily supplied from Pennsylvania or Ohio fields.

Although still comparatively small, the Canadian steel industry has grown steadily, total rated annual capacity now exceeding 2,000,000 gross tons. Facilities for making pig iron, it is noted, are limited. The industry's present heavy dependence on imported raw materials proves a major handicap.

Large-scale petroleum development dates from 1936, when heavy crude oil was successfully produced in Alberta. Nearly 7,000,000 barrels of crude were turned out in 1938, compared with 200,000 in 1914. While rapid progress has been shown, the industry still supplies but a small proportion of domestic demand.

Shift from an agricultural to an industrial economy was first accelerated by the outbreak of hostilities in 1914, has since continued at a rapid rate. Volume index of Canadian manufactures stood at 100 in 1917 and 157.5 in 1929, while for 1937 it was estimated at 162.

The comparative importance of leading industries has been changing accordingly. Ninth in 1929, the nonferrous smelting and refining industry climbed to No. 1 position in 1937. Petroleum products and electrical apparatus also gained. Canada's ten leading manufacturing industries in 1937, according to gross value of product:

(Thousands of Canadian Dollars)	
Nonferrous smelting and refining	$318,278
Pulp and paper	226,245
Slaughtering and meat packing	181,419
Automobiles	134,810
Flour and feed mills	133,634
Butter and cheese	124,935
Sawmills	104,850
Electrical apparatus	98,842
Petroleum products	98,454
Railway rolling stock	93,855

A vital resource and dynamic factor in its industrial growth has been the dominion's abundance of hydroelectric power, over 98 per cent of total power consumed now being generated by hydroelectric equipment.

Indicating Canada's development as an exporting nation was her rank last year as fourth among the world's trading countries. Although exports in the fiscal year ended March 31, 1939, declined to $927,000,000 from $1,070,000,000 the preceding year, they were more than twice those of 1914. Principal exports today are newsprint, gold bullion, wheat, nickel, copper, aluminum.

Importing principally from the United States, Canada is unlikely to be greatly hampered in production by wartime interference with shipping. Leading imports: Petroleum, coal, machinery, steel, auto parts, sugar and farm implements.

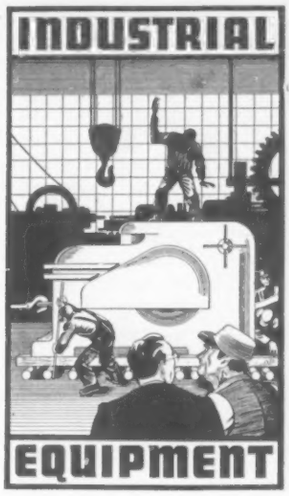
Although already far ahead of its position in 1914, Canadian industry is considered certain to undergo considerable expansion in playing its new role in this war. Steelmakers are drawing up programs for plant extensions and installation of additional equipment, in preparation for large British orders.

Should Canadian expansion be great, when peace returns she will be able to supply more of her domestic requirements and increase her exports. Thus the United States may find Canada a less important market for finished products and a keener competitor abroad.

CANADA BUYS MORE STEEL, IRON FROM UNITED STATES

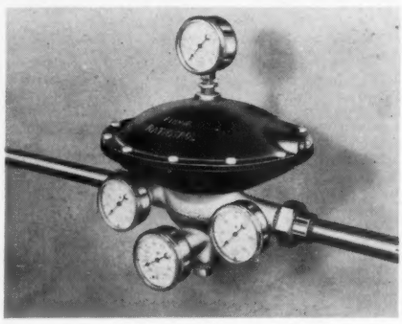
Canadian steel and iron imports in September were valued at $16,309,000, compared with $11,560,000 in the corresponding month last year. Steel and iron imports from the United States rose from $9,872,000 to $14,362,000. Machinery was the largest item, valued at $3,128,000, compared with $2,487,,000 in September, 1938. Other imports from the United States included automobile parts, $2,273,000; plates and sheets, $1,496,000; automobiles, $1,386,000; rolling mill products, $846,000; engines and boilers, $685,000; tools, $159,000; tubes and pipes, $147,000; pigs and ingots, $150,000; castings and forgings, $122,000; stamped and coated products, $105,000; hardware and cutlery, $101,000.

September steel and iron exports were valued at $4,507,000, compared with $3,927,000 for the same month last year. Shipments to the United States were valued at $409,000 against $227,000.



Controls Atmosphere In Oil-Fired Furnace

■ Air-Oil Ratiotrol developed by North American Mfg. Co., 2910 East Seventy-fifth street, Cleveland, maintains a constant atmosphere despite fluctuation of oil or air pressure and despite varying rates of fuel input



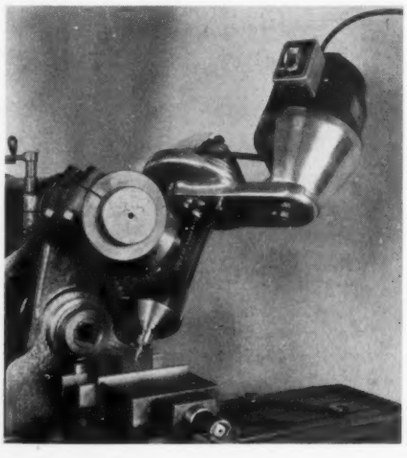
or manipulation of individual burners.

Instrument proportions flow of fuel oil and its combustion air by controlling pressures and making them dependent upon each other. Air pressure alone becomes the dominant factor, while the number of burners and their individual settings have no effect on the operation.

Milling Attachment

■ Lockwin & Co., 205 West Wacker drive, Chicago, announces the sale of Rusnok all-duty, high-speed, motor-driven vertical milling attachment which converts a horizontal milling machine into a universal mill. This attachment can be handled by one man, fits all round overarm milling machines, operates at any angle—single or compound—and is equipped with Timken roller bearings.

Spindle is hardened and ground all over and uses No. 9 B. & S. taper shank for end mill holders or taper shank end mills, drawbar style. Only two sizes of holders are required to hold the complete range of end mills from 1/16 to ¾-inch.



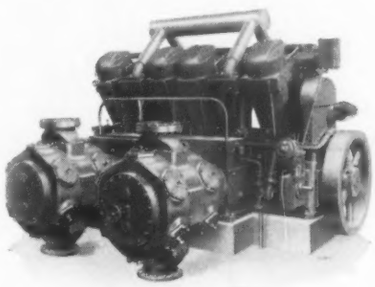
Spindle housing is graduated 360 degrees and has a 3-way squaring surface 7½ inches long. Overarm bracket is expanded with spreader screw for easy mounting.

Operations performed by this attachment include surfacing mild steels and cast iron, boring large holes, key slotting, fly cutting without chatter and many types of operations with end mills, slitting saws and small angle milling cutters.

Attachment complete with ½-horsepower motor and one ½-inch straight shank end mill holder costs $185.

Gas-Powered Compressor

■ Ingersoll-Rand Co., Phillipsburg, N. J., has put on the market a heavy-duty, gas-powered, 4-cycle compressor known as the "LVG" in 485 and 650 horsepower sizes using six or eight V-type power cylinders. By using only two compressor frames on either size, the inlet, discharge and interstage piping and



manifolding are simplified, and only two stuffing boxes are required.

The LVG has overhead valves and removable wet-type liners in the power cylinders. All auxiliaries, including camshaft, built-in recirculating water pump and auxiliary power take-off, are driven from flywheel end of the shaft.

Lubrication is full force-feed, with continuous oil cooling and oil filtration. Power pistons have oil-cooled crowns. Governing provides for manual or automatic speed control down to half-speed.

Protective Filters

■ Three new chemical cartridges have been developed by American Optical Co., Southbridge, Mass., for their R1000 respirator. Cartridges are interchangeable with standard type A dust cartridge. Each provides protection against type A dusts or nonlethal concentrations of certain fumes and vapors.

One cartridge is for concentrations of fumes and gases encountered in paint spraying and other light organic vapors. If desired, a protective cover can be supplied to retard plugging when the respirator is used in paint spraying. The second cartridge can be used against low concentrations of acid gases, and the third against low concentrations of acid organic gases.

10-14 No cut

Fork Trucks

■ Baker-Raulang Co., 2168 West Twenty-fifth street, Cleveland, announces its Type JOM, Series F, center-control fork trucks in capacities from 2000 to 7000 pounds in tilting or nontilting, telescoping or nontelescoping models.

Lifting system comprises a gear pump driven by a standard Baker motor, a release valve, and a jack cylinder. Putting the control handle into the lifting system opens the valve in the appropriate manner and starts the pump motor. Putting the control into the lowering position opens the valve and permits the fluid from the jack cylinder to return to the reservoir, the speed of lowering being entirely controlled by the operator.

In telescoping models, a total fork lift of 126 inches is available with standard overall height of 88 inches, suitable for box car work. Forks will lift 24½ inches before the inner telescoping uprights start to move, increasing the overall height.

Frames are of high-tensile steel

plates, while uprights are machined channels of abrasion-resisting alloy castings. Rear end of frame is provided with a heavy iron casting which serves as bumper and counterweight for the overhanging load.

On trucks of 4000 pounds capacity and over, all wheels are mounted on tapered roller bearings and hydraulic wheel brakes are provided on the drive wheels. The 4000-pound truck has a wheelbase of 43½ inches, an overall length of 70 inches not including the length of the load, an outside turning radius of 70 inches and will operate in intersecting aisles 63 inches wide. Normal travel speeds are up to 6 miles per hour, hoisting speeds up to 35 feet per minute, and lowering speeds up to about 100 feet per minute.

Drafting Machine

■ L. G. Wright Inc., 5209 Euclid avenue, Cleveland, announces Model D-520 Wrigraph portable drafting machine for drawings 20 x 26 inches or smaller. Machine is finished in black wrinkle enamel and heavy nickel plating and has a special "tack on" mounting plate so that it can be instantly fastened to any flat wooded surface in any position. Protractor is of the one-degree indicating type and has a transparent-edge engine-divided scale. Scales are interchangeable on the protractor head, and all standard graduations are available. Price complete including one set of scales is $19.00.

Rechargeable Flashlight Battery

■ Quirk Battery Co., Highland Park, Ill., announces Charg-O-Matic, a spill-proof storage-cell battery that fits all standard flashlight cases in which two ordinary 1¼-inch size D dry-cells are used. A small and simple charging unit is provided which recharges the cell overnight, operating on 110-120-volt 60-cycle alternating current at a very small cost. A charging clip for automobile, truck or bus use operating from the car battery also is available. One discharge cycle is said to be equivalent to that of a pair of dry-cells.

Applies Adhesive Tape

■ An attachment has been devised for the Tough Edge Binder made by Vertex Co., 5-7 Great Jones street, New York, to apply adhesive tapes of various widths to one side of documents, tracings, blue prints, index cards, fillers for ring binders, book jackets, sheets of metal foils, felt, glass, etc. The binding of an edge now may be performed by applying the tape on one side only or by folding it over the edge.

Lamp Resistor

■ Ward Leonard Electric Co., Mount Vernon, N. Y., announces a new Vitrohm resistor for operation of fluorescent lamps on direct current. Mounted in a small perforated metal enclosure, resistor is designed in accordance with specifications of lamp manufacturers and is listed by the Underwriters' Laboratories, Inc.

Long flexible leads facilitate connecting the units when mounted in any standard fixture, wiring trough or channel. Units are available for lamps of 15, 20, 30 and 40-watts. A plug-in type for portable use also is available for 15 and 20-watt lamps.

Recorder-Controller

■ An economical means for obtaining accurate control of electric furnaces and ovens without the use of rheostats, transformers or other expensive equipment, is said to be provided in a new recorder-controller for throttling electric heat recently developed by the C. J. Tagliabue Mfg. Co., Park and Nostrand avenues, Brooklyn, N. Y.

The instrument is claimed to have no measurable controller "dead zone" and to hold a steady temperature instead of the oscillating

AMERICAN *Radial* BEARINGS

Use them wherever the load is radial, and American Radial Bearings will return dividends on your investment . . . dividends in friction-reduction . . . dividends in length of satisfactory service.

American Radial Bearings, of the grooved inner-race type, are simple in design, precise in construction. This style of bearing can be furnished in any standard S.A.E. dimension, with either the inner or outer race grooved for cage retainment. Both races and rollers are made from a special, heat-treated alloy steel.

Specify American Radial Bearings next time.

AMERICAN ROLLER BEARING COMPANY, PITTSBURGH, PA.
Pacific Coast Office: 321 W. Pico St., Los Angeles

AMERICAN
Heavy-Duty ROLLER BEARINGS

temperature of "on-off" or two-position control. By reciprocating the control contacts, throttling regulation of electric heat is obtained.

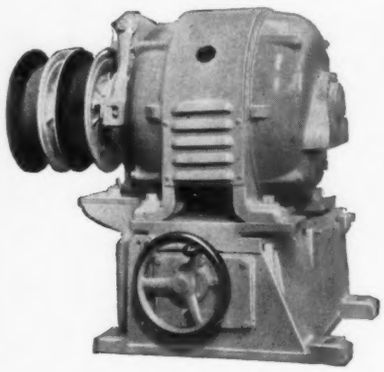
When the temperature is far below the desired control point, as in starting, the recording carriage indicating the furnace temperature does not engage the reciprocating control mechanism and therefore the power supplied to the furnace is on 100 per cent of the time.

The action of the instrument is such that the recording carriage comes to rest in a position which balances the heat input against the heat loss. The throttling zone can be adjusted readily within wide limits and load error kept within a few degrees without introducing appreciable hunting. Adjustment for load error is provided.

Multiple Belt for Variable-Speed Motors

■ U. S. Electrical Mfg. Co., 200 East Slauson avenue, Los Angeles, has developed a multiple belt for drives of variable-speed motors. Turning a hand wheel changes speed by shifting motor on the base, which moves a yoke to actuate the pulleys.

New lubrication system is used to grease the pulley sliding fits. Shaft is hollow through the pulleys and grease is ejected through orifices to



the sliding surfaces. The end of the motor shaft also is equipped with a grease fitting.

Belt may be tightened or loosened without shifting the entire base by a set screw which turns the eccentric bushing at the pivot of the shifting yoke arm.

Variable Speed Pulley

■ Linderme Machine & Tool Co. Inc., 12261 Coyle avenue, Detroit, has developed a V-type belt pulley that may be adjusted quickly to change speeds. Two separate parts of this pulley are sleeve fitting rather than threaded, which is claimed to make a more accurate adjustment and truer running pulley.

One locking screw by a turn of an Allen wrench is tightened into recess and securely locks pulley in exact adjustment. This design is claimed to allow for a maximum of speed variations and shortens time to adjust pulleys from one speed to another.

Anode Bag

■ "Style D" anode bag of closely woven Sanforized drill material with top and bottom impregnated with red resin has been developed by Hanson-Van Winkle-Munning Co., Matawan, N. J. Bags are 5 inches wide, single ply with a special sewing. For anodes 12 to 20 inches long, bags are 4 inches longer than the anode and tops are coated 3 inches down and bottoms 4 inches up. Anodes 20 to 40 inches long require bags 5 inches longer than the anode and having 4½ inches of coating at the bottom as there is more room needed for the collection of sludge.

Resin tops prolong the life of bag and permit bags to be fastened to the anodes by two pieces of tape which pass through holes punched through the bag ½-inch down from top. Red top also indicates proper solution level.

KINNEAR *Rolling* DOORS

EFFICIENT *from the Ground Up!*

DESIGNED TO FIT THE OPENING-- EASY TO INSTALL!

COILS ABOVE LINTEL --SAVES SPACE!

OPENS OUT OF REACH OF DAMAGE!

RAISES OVER SNOW, ICE, OBSTACLES!

CAN'T BIND, WARP, SAG OR PULL APART!

REPELS FIRE; DEFIES INTRUSION, WEATHER!

SLATS CAN BE INDIVIDUALLY REPLACED!

You know you're going to get money-saving door efficiency when you install Kinnear Rolling Doors. They've been tried and proved in the world's best testing grounds—**in actual use,** under some of industry's most gruelling conditions—for more than forty years! And talk about durability! Rugged steel slats formed into an all-steel curtain and **anchored** in rigid steel jamb guides, make Kinnear Rolling Doors almost **wearproof!** They're built for any doorway, for motor or manual control. Let us send complete details. Write!

The KINNEAR MFG. CO.
1780-1800 FIELDS AVENUE
COLUMBUS, OHIO
Officers and Agents in Principal Cities

"Dry" Furnace Practice

(*Concluded from Page* 58)

a mixture of air and products of combustion. Obviously, this is a direct application of energy and avoids efficiency losses of steam generation or the prime mover for driving refrigerating machine and those losses incidental to refrigerant cycle and to energy transmission. Reactivation also may be accomplished with steam at pressures above 90 pounds.

While solid adsorbents may be applied either before or after the blowing engines, it is thought considerable development will be necessary to make this equipment satisfactory for dry-blast operation. An important problem is how to obtain the necessary ruggedness to withstand reciprocating blowing engine pulsations without abrading the granular dehydrants; also how to obtain clean and well dried gas.

Dehydration with Absorbent Liquids

Solutions of certain salts such as calcium chloride, calcium bromide, lithium chloride and lithium bromide likewise have an affinity for water vapor. These are generally used on "contactor" plates over which the solution is flooded.

Air is drawn between parallel plates flooded with solution. As moisture is absorbed, the equivalent latent heat is converted into sensible heat. The heat is removed by means of a cooler. For high dew points, lake water may be used for cooling, but for low dew points the water must be refrigerated.

There is another circuit carrying about 20 per cent of pump capacity first through an exchanger or economizer and then through a solution heater to obtain a 200-degree Fahr. temperature. The hot solution is contacted with outside air circulated through the concentrator, which air then carries off an amount of water equal to that absorbed. Then the concentrated solution flows back into the system.

Important features of liquid absorption are that a small amount of refrigeration is required at a relatively high suction temperature and that the temperature range in which the work is done is high.

If "contactor" plate surface is selected liberally, the effect of changes in air velocity or volume will be relatively small, and regulation of the strength and temperature of the solution can be relied upon to give accurate control.

Where adequate precooling is provided, the liquid absorbents may be employed after compression and the "run around" utilized to recover some of the heat of compression.

(*Concluded next week*)

For "Set" Locations
use the
BOLT SUSPENSION TYPE
A-E-CO LO-HED HOIST

When — 1. Loads must be simply raised and lowered, not moved along a path. 2. Special trollies for various monorail systems are necessary—

The *bolt suspension type* (without trolley) A-E-CO Lo-Hed Hoist is the sensible one to use.

For high-lights of this hoist see A-E-CO POINTS (below). For full details of Lo-Hed hoists, send for our new catalog today.

A-E-CO POINTS

- Lo-Heds range from ¼ to 12 ton capacities (above type available from ¼ to 12 tons).
- Operates on Standard I-beam or track of any other hoist.
- Safe, fool-proof.
- Compact, strong, simply constructed.
- Protected against dust, moisture, fumes.
- Heavy duty, ball-bearing HOIST motor.
- Automatic lowering brake.
- Ball or roller bearings at vital points.
- Improved plow-steel cable.
- 100% positive automatic stop.
- Efficient spur-gear drive . . . and

LO-HED COSTS LESS PER LIFT

OTHER A-E-CO PRODUCTS: Taylor Stokers, Marine Deck Auxiliaries, Hele-Shaw Fluid Power.

A-E-CO Lo-Hed HOISTS

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

MATERIALS HANDLING

Built-In Conveyor

(*Continued from Page* 62)

or length of the spots to the exact amount desired.

The particular job for which this machine was designed consists of series spot welding of 19-gage oil baffle plates to 18-gage oil cover plates for both six and eight-cylinder cars. The machine includes a 50-kilovolt-ampere transformer, timer, contactor and conveyor, all completely self-contained in the single unit shown in the accompanying illustration.

The dies are designed to permit simultaneous and interchangeable welding of baffle plates to both six and eight-cylinder cover plates.

The built-in conveyor has been found an essential in obtaining the production speed of 450 pieces per hour for which the machine is designed. However, this speed is readily adjustable to suit any rate desired to synchronize flow of parts

in production. Thus the conveyor eliminates the necessity for storage of either finished or unfinished work at the machine as it permits parts to be welded at the same rate as they are supplied.

Any changes in conveyor speed are quickly compensated for in the welder by changing the dial setting on the timer. This permits retaining the same length and spacing of spots irrespective of production rate or speed of the conveyor.

In addition, there are other advantages of this setup. It permits use of a smaller machine with a smaller transformer. External water cooling of the work is eliminated. The seam rolls themselves are internally water-cooled. The arrangement has permitted decreased current and power consumption, thus affording increased economy of operation. The transformer is of low-impedence design and is close coupled in the inductive loop.

Without doubt the near future will see similar applications of conveyors to processing machinery as the advantages appear limited only by the importance of the machine in the production lineup.

Eyes Are Expensive Targets

(*Concluded from Page* 53)

how the latter is apt to prove much more effective. Dollars and cents presentations and comparisons similar to the above will be found of much value.

While plant surveys and mandatory rules are valuable in operating any eye-protection program, it is extremely important to have sufficient facts and figures to justify them. It is for this reason also that accurate record should be kept and findings presented in dollars and cents.

Typical example of what can be done follows: In 1929, a company in the metalworking industry employed 41,500 people. Eye accidents in that year alone cost $51,000, or more than $1 per employe. The safety director was on his toes and saw what could be done. He presented his figures to the management and received support for an eye-protection program.

Result was that in 1936 with 43,500 employes, or 2000 more than were working in 1929, the bill for eye injuries was $5800, as contrasted with $51,000. Assuming that eye-protection equipment cost $30,000, this company is still $15,000 ahead—certainly a sizable saving.

A second company employed 2700 people. During the eight years preceding inauguration of an eye-protection program, $19,942 was paid out for eye accidents. In 1920 alone $3500 was paid out with only 1114 people on the payroll. In 1928 an eye-protection program was placed in operation and the bill for eye accidents for that year was a little over $50.

In the next eight years, total cost of eye accidents was only $3334, or $16,600 less than the previous eight years, although number of employes had increased to more than double the original number.

Thus, as shown by cost of even a minor eye injury, eyes are expensive targets. A second significant fact is that National Safety Council statistics show 72 per cent of all eye injuries occur on jobs now regarded as nonhazardous to eyes. Equally significant is that the slightest eye injury costs more than the goggle that would have prevented it.

Anhydrous Metal Cleaners

■ Technically anhydrous metal cleaners to remove all smut and chemically clean the surfaces of ferrous and nonferrous metals have been developed by Cowles Detergent Co., 10525 Carnegie avenue, Cleveland. Being anhydrous, these cleaners have a reduced bulk and are claimed to reduce handling and cleaning costs and to speed up production. Manufactured under basic patents Nos. 1,774,872 and 2,110,363 together with processes not yet disclosed, the cleaners have unusual activity, stability and concentration.

Base materials are completely reacted and bonded above 2400 degrees Fahr., and stability of the base products permits admixtures with practically all auxiliary cleaning materials. Cleaners are made in seven grades for light, general, heavy and extra-heavy duty cleaning with and without suitable emulsifiers and wetting agent.

Human Relations Ideas For the Executive

■ *Human-Relations Manual for Executives*, by Carl Heyel; cloth, 253 pages, 5 x 7½ inches; published by McGraw-Hill Book Co., New York; supplied by STEEL, Cleveland, for $2.

This book deals essentially with people, gives quick pictures of what companies have done and are doing in handling human problems involved in selecting, training people, getting along with them, making them work efficiently, making their work pleasant, safe and healthful as possible and the like.

The theory about which the book has been written is that a good idea that works in one line of endeavor often can be applied in another, with the right modification. Growing social consciousness and increase of legislation on social relations is changing the picture and more factors are appearing to influence the situation from without. Greater consideration for the worker has resulted from this trend and management has altered its viewpoint in many ways.

The book's purpose is to point out what other people have done and are doing and to stimulate thought about people on the part of anyone with supervisory responsibilities. It is well indexed to help the reader refer quickly to ideas on a given subject.

It Pays to Use Dependable Wire Rope

When a wire rope fails, the equipment on which it is used is temporarily out of business, production stops, time is lost and labor is wasted... The best recommendation for "HERCULES" (Red-Strand) Wire Rope is its performance record, by which it continues to make and hold friends—year after year... In order to be suitable for all purposes, "HERCULES" is made in a wide range of both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type... If you will tell us how you use Wire Rope, we shall be glad to suggest the construction and type we consider best for your conditions.

"HERCULES" RED-STRAND WIRE ROPE REG. U.S. PAT. OFF.

Made of Acid Open-Hearth Steel Wire

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SEATTLE · · · 3410 First Avenue South

Welded Piping System

(*Concluded from Page 64*)

ice in a steel mill so this saving was utilized to make a better piping system able to stand overloading and abuse.

Total cost of the variable factors for the welded flanged job was $1682.35 compared with $3197.22 estimated for the flanged job. This is a saving of 46.8 per cent in the variable cost factors. Furthermore, there was a labor reduction of 15.9 per cent.

If the welded job were only as good as the flanged, welding would have been chosen on the basis of direct cost and indirect cost such as reduction of friction loss. But the welded job also has other important advantages that are difficult to evaluate. Perhaps most important is the greater strength of the welded joint.

Equally important was the great simplicity introduced by welding and reflected in several ways. Chief of these was elimination of some 124 gasketed joints, thereby reducing maintenance and possibility of system shutdown. Elimination of large bulky flanges increased head room in the basement and decreased the difficulty of enclosing each cooling group in an air chamber. Thus space requirements greatly favored the welded job. Pipe clearances are greater and the completed job has a neater appearance. If it is desired to apply insulation to the pipes later, few flanges are present to interfere.

Furthermore, general elimination of cast elbows simplified the run from coolers at main drives to those at the flywheel set. Bends were made easily at any convenient angle needed. Simple welded brackets were made right on the job for pipe supports, simplifying this portion of the work.

In completing the above job, arc welding was employed almost exclusively.

"PRODUCTION INCREASED—WELDING TIME SAVED" SAY SCORES OF CASE HISTORIES

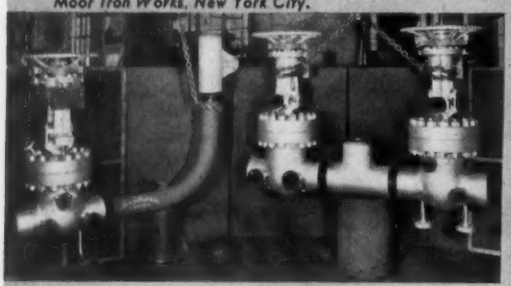
In case after case, where Murex Electrodes have gone on the job, users report important savings in welding time, increased production, and lower welding costs.

And, with all the economy of Murex Welding, there's never a sacrifice in quality. The Murex line includes electrodes that give sound, X-ray clean deposits, that assure beautifully smooth-neat welds, that meet every requirement for strength and ductility.

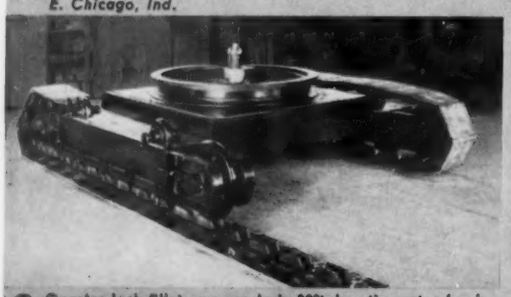
Write, now, and ask to have our representative demonstrate the Murex Electrode most suited to your needs. At the same time, make use of his broad experience: Let him lend a hand on your welding problems. There is no obligation whatever.

Ask, too, for the handy, pocket-size Murex pamphlet giving information on twenty different Murex Electrodes.

1 "It's easy to qualify welders with Murex," says one manufacturer of oil refinery equipment. *Photo courtesy Edge Moor Iron Works, New York City.*



2 Production of fabricated piping was speeded 100% in a Michigan plant. *Photo courtesy George B. Limbert Co., E. Chicago, Ind.*



3 Quarter inch fillets are made in 30% less time at a leading Pennsylvania fabricator's. *Photo courtesy The Hanson Clutch & Machinery Co., Tiffin, O.*

4 In plant after plant welders prefer Murex because smooth clean deposits save time. *Photo courtesy Blaw Knox Co., Blaw Knox, Pa.*

5 Murex proved 37.5% faster for heavy downhand work in tests run by a large Detroit manufacturer. *Photo courtesy United Welding Co., Middletown, O.*

MUREX
HEAVY COATED
ELECTRODES

METAL & THERMIT CORPORATION
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New Titanium Carbide Alloy For Cutting Tools

■ A carbide containing tungsten, tantalum and titanium carbides, known as grade 78, has been developed by Carboloy Co. Inc., 11185 East Eight Mile road, Detroit, for use in cutting tools. Grade 78 is used for taking cuts as heavy as ⅜-inch with feeds up to 3/64-inch per revolution in the machining of steel bars and castings.

A typical example of the results obtained with grade 78 is shown by its use for finish turning eleven steps varying from 1¼ to 2.78 inches diameter on an SAE 1045 steel shaft 35 3/16 inches long. Previously this operation required floor-to-floor time of 33 minutes per shaft. Cutting tool tipped with the new carbide now completes the operation in 18 minutes and effects a 45 per cent reduction in machining time. This does not include the saving in down time and grinding time due to longer tool life. Speed used is 180 feet per minute with feed of 0.020-inch per revolution.

Tinning Bath Blanket Eliminates Dross Loss

■ W. H. Spowers Jr., 551 Fifth avenue, New York, announces a new and economical liquid blanket to prevent formation of dross or oxides on surface of tin baths.

Due to cost of tin per pound, prevention of residuum loss effects a considerable saving in tinning. In tinning No. 18 gage wire in one small molten tin bath, one manufacturer of wire using the new liquid blanket found the consumption of tin was reduced from an average of 103 pounds per week to 58 pounds per week for the same tonnage of wire.

The formula used for this blanket is simple and may be made up by the operator in the shop.

Little Impression Made in Backlogs

Steel Orders Close to Shipments; Stocks Slow To Expand

MARKET IN TABLOID ★

Demand
Brisk; future buying reduced by prior coverage.

Prices
Strong on finished steel, pig iron; scrap off further.

Production
Up ½-point to 93½ per cent.

■ STEEL shipments are catching up with orders, but backlogs are slow to decline despite record-breaking production. Last week saw ingot output advance ½-point to 93½ per cent.

Slightly better deliveries are available on some products, including plates and shapes. Backlogs of other items extend two to four months, and the bulk of new business necessarily is for next quarter delivery.

Brisk rate of steel consumption has been indicated for a number of weeks by the urgent calls from buyers for heavier shipments. This situation is unabated, particularly as regards demand for the commoner products, and suggests that steel is moving promptly into consumption rather than into stock.

Evidence that inventory additions have been moderate is substantiated by STEEL'S survey showing an average increase of only 12.2 per cent in raw steel stocks of representative metalworking companies between Sept. 1 and Nov. 1. Considering that finished steel shipments in September and October were about 50 per cent larger than in the preceding two months, and the fact stocks on hand prior to the fall recovery were relatively light, inventories in many instances appear to be below normal on the basis of current consumption.

It seems likely that steel stocks will be expanded further this month and next. Buyers have covered forward needs more extensively than usual because of delayed shipments by mills, but the question of whether or not future coverage has been overdone probably will be answered by the manner in which finished goods move into consumption. Stocking of manufactured articles apparently has been more pronounced than has inventory accumulation of steel products.

Mill backlogs assure a continuation of heavy operations into first quarter, although a further increase in domestic consumption or in foreign demand will be necessary for an indefinite extension of steelmaking at its present rate. Little business is being placed for belligerent nations, and export orders from other countries continue smaller than would be indicated by the volume of inquiries.

Domestic requirements are receiving strong support from the railroad equipment, automotive, shipbuilding, farm equipment and building and engineering construction industries. Automobile assemblies, still hampered by the Chrysler strike, edged up to 86,700 units last week but fell 11.5 per cent below the total a year ago. General Motors turned out 48,180 units, Ford 22,615 and all others 15,905.

Except for the New York Central's distribution of orders for 64,000 tons of rails and accessories, railroad markets for equipment and track material are quiet. However, heavy steel shipments remain to be made against orders placed previously.

A similar situation exists in shipbuilding. Few additional vessels are pending, but specifications have yet to be issued for a large steel tonnage required for boats now on order.

Inquiries for structural shapes and concrete reinforcing bars have moderated further, although shipments continue active. Private construction has taken up some of the slackening in volume of public works recently.

Steel demand from farm equipment builders is more prominent as schedules are nearing a peak expected to be reached in early December.

Scrap markets are giving a less favorable aspect to the future outlook for steelmaking. Price weakness was more pronounced last week, declines of $1 a ton at Pittsburgh and Chicago and 25 cents in eastern Pennsylvania reducing the scrap composite 75 cents to $19.58. This is the sixth consecutive drop since the composite reached a fall peak of $22.16. Quietness in export demand is held responsible for easier prices in some districts.

Finished steel prices continue firm, with definite word on first quarter quotations still awaited. The consensus still is that only a few small increases at most will be named for the new period.

Steelmaking in most districts has reached the limit of available capacity, with shutdowns for furnace repairs partly responsible for recent slight variations. Last week Pittsburgh leveled off at 94 per cent, while Chicago increased 2 points to 93 per cent and Youngstown dropped 3 points to 90. Other advances included 3 points to 87 in eastern Pennsylvania, 2½ points to 90 at Cleveland, 3 points to 93 at Buffalo, 10 points to 100 in New England, 1½ points to 88½ at Cincinnati and 4 points to 81 at St. Louis. Detroit declined 5 points to 95, with Wheeling holding at 93 and Birmingham unchanged at 94.

COMPOSITE MARKET AVERAGES

	Nov. 18	Nov. 11	Nov. 4	One Month Ago Oct., 1939	Three Months Ago Aug., 1939	One Year Ago Nov., 1938	Five Years Ago Nov., 1934
Iron and Steel	$37.44	$37.53	$37.62	$37.62	$35.95	$36.39	$32.15
Finished Steel	55.90	55.90	55.90	55.90	55.60	56.68	54.00
Steelworks Scrap..	19.58	20.33	20.83	21.45	15.30	14.58	9.82

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week: Average for Last Month, Three Months and One Year Ago

Finished Material

	Nov. 18, 1939	Oct. 1939	Aug. 1939	Nov. 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.25
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Terre Haute, Ind.	2.15	2.13	2.05	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15-2.40	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.00	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.00	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.10
Wire nails, Pittsburgh	2.55	2.50	2.40	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	Nov. 18, 1939	Oct. 1939	Aug. 1939	Nov. 1938
Bessemer, del. Pittsburgh	$24.34	$24.34	$22.34	$22.34
Basic, Valley	22.50	22.50	20.50	20.50
Basic, eastern, del. Philadelphia	24.34	24.34	22.34	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	22.21	22.21
No. 2 foundry, Chicago	23.00	23.00	21.00	21.00
Southern No. 2, Birmingham	19.38	19.38	17.38	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	20.89	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	23.215	23.215
Malleable, Valley	23.00	23.00	21.00	21.00
Malleable, Chicago	23.00	23.00	21.00	21.00
Lake Sup., charcoal, del. Chicago	30.34	30.34	28.34	28.34
Gary forge, del. Pittsburgh	23.17	23.17	21.17	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$21.25	$23.15	$16.15	$15.15
Heavy melt. steel, No. 2, E. Pa.	18.75	20.00	14.40	12.75
Heavy melting steel, Chicago	17.25	19.25	13.75	14.20
Rails for rolling, Chicago	20.25	21.90	17.75	17.40
Railroad steel specialties, Chicago	21.25	21.75	15.50	16.10

Coke

Connellsville, furnace, ovens	$5.00	$4.75	$3.75	$3.75
Connellsville, foundry, ovens	6.00	5.80	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.10c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c-2.40c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.35c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per pound)	
Polished fence staples	2.55c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool	$2.70
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh $3.70

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Pacific Coast points	2.60c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller 70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers	and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½ "O.D.	13	$ 9.72	$23.71
1¾ "O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼ "O.D.	13	13.79	21.68
2¼ "O.D.	12	15.16	.....
2½ "O.D.	12	16.58	26.57
2¾ "O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½ "O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2¼ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 47/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$5.00- 5.50
Connellsville, fdry.	5.75 -6.25
Connell. prem. fdry.	6.00- 6.50
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	8.25
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.‡	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.45	25.45	24.95	24.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	23.50	23.50	23.00	.....
St. Louis from Birmingham	†23.12		22.62	.....
St. Paul from Duluth	25.63	25.63	.....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $27.50; 6.51-7—$28.00; 7-7.50—$28.50; 7.51-8—$29.00; 8-8.50—$29.50; 8.51-9—$30.00; 9-9.50—$30.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00
Ohio	
First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$26.00-$27.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, tide., duty pd. ...$100-110.00
Do., del. Pitts., ..105.33-115.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot.. 32.00
Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent..... 126.00
Spot, $5 a ton higher.

Silicomanganese, 2½ c. 103.00 2% carbon, 108.00; 1%, 118.00 Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 2.00-2.10

Ferrovanadium, 35 to 40%, lb., cont..2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c
67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots..... 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb...	16.50c	17.25c	17.75c
1% carb...	17.50c	18.25c	18.75c
0.10% carb.	19.50c	20.25c	20.75c
0.20% carb.	18.50c	19.25c	19.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots... $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb..... 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls... $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton. $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots.... 150.00
15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. .. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots..... 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract... 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c
Ton lots 5.50c
Less-ton lots 5.75c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots.. 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.93	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.58	3.68	3.68	3.75	3.80	5.42	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.73	....	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.19	....	4.69	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
*Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	....
Los Angeles	4.15	4.65	6.35	4.00	4.00	6.40	3.75	6.50	5.15	....	6.15	10.65	9.80
San Francisco	4.00	4.35	6.00	4.00	4.00	5.60	3.75	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.63	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.78	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 or 2000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Nov. 16

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$19.65 5 0 0	$29.82	3 10 0
Basic bessemer	....	19.59	2 6 0
Hematite, Phos. .03-.05	20.63 5 5 0	.....	.....
Billets	$28.98 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	44.70 11 7 6	46.86	5 10 0
Standard rails	$37.34 9 10 0	$48.99	5 15 0
Merchant bars	1.93c 11 0 0	2.50c	6 11 6
Structural shapes	1.75c 10 0 0	2.72c	7 3 0
Plates, †¼ in. or 5 mm.	1.91c 10 18 9	2.96c	7 16 0
Sheets, black, 24 gage or 0.5 mm.	2.28c 13 0 0	3.99c	10 10 0
Sheets, gal., 24 ga., corr.	2.76c 15 15 0	4.70c	12 7 6
Bands and strips	2.14c 12 5 0	2.74c	7 4 0
Plain wire, base	3.41c 19 10 0	3.04c	8 0 0
Galvanized wire, base	4.07c 23 5 0	3.61c to 3.66c	9 10 0 to 9 12 6
Wire nails, base	....	3.52c	9 5 0
Tin plate, box 108 lbs.	$ 6.19 1 11 6	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich §§Mark	
Fdy. pig iron, Si. 2.5	$19.45	4 19 0(a)	$15.15	679.30	$22.96	700	$25.33	63
Basic bess. pig iron	18.18	4 12 6(a)	.....	.....	.....	...	27.94 (b)	69.50
Furnace coke	4.52	1 4 2	5.02	225	7.38	225	7.64	19
Billets	28.98	7 7 6	22.95	1,029	28.21	860	38.79	96.50
Standard rails	1.66c	9 10 0	1.41c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.03c	10 12 0‡	1.30c	1,304	1.88c	1,250	1.98c	110
Structural shapes	1.82c	10 8 0††	1.27c	1,268	1.88c	1,250	1.93c	107
Plates, †¼-in. or 5 mm.	1.92c	10 19 3††	1.65c	1,650	2.21c	1,475	2.29c	127
Sheets, black	2.58c	14 15 0§	1.96c	1,958‡	2.63c	1,750‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.02c	17 5 0	2.85c	2,850	4.05c	2,700	6.66c	370
Plain wire	3.41c	19 10 0	2.00c	2,000	2.48c	1,650	3.11c	173
Bands and strips	2.16c	12 7 0††	1.44c	1,444	1.95c	1,300	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	17.00
Bos. dock No. 1 exp.	18.25-18.50
New Eng. del. No. 1	18.00-19.00
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	17.50-18.00
Chicago, No. 1	17.00-17.50
Chicago, auto, no alloy	16.00-16.50
Chicago, No. 2 auto	14.00-14.50
Cincinnati dealers	15.50-16.00
Cleveland, No. 1	19.00-19.50
Cleveland, No. 2	17.50-18.00
Detroit, No. 1	†16.00-16.50
Detroit, No. 2	†15.00-15.50
Eastern Pa., No. 1	20.50
Eastern Pa., No. 2	18.50-19.00
Federal, Ill.	15.50-16.00
Granite City, R. R.	16.50-17.00
Granite City, No. 2	15.25-15.75
Los Angeles, No. 1	17.00-17.50
Los Angeles, No. 2	16.00-16.50
L. A., No. 1 f.a.s.	18.50-19.50
L. A., No. 2 f.a.s	17.50-18.50
N. Y. dock No. 1 exp.	17.50
Pitts., No. 1 (R. R.)	22.50-23.00
Pittsburgh, No. 1	21.00-21.50
Pittsburgh, No. 2	19.00-19.50
St. Louis, R. R.	17.50-18.00
St. Louis, No. 2	15.25-15.75
San Francisco, No. 1	17.00-17.50
San Francisco, No. 2	16.00-16.50
Seattle, No. 1	14.50-15.50
Toronto, dlrs., No. 1	11.25
Valleys, No. 1	20.50-21.00

COMPRESSED SHEETS

Buffalo, new	19.00-19.50
Chicago, factory	16.50-17.00
Chicago, dealers	14.50-15.00
Cincinnati, dealers	15.00-15.50
Cleveland	18.50-19.00
Detroit	†17.00-17.50
E. Pa., new mat.	20.50
E. Pa., old mat.	17.50-18.00
Los Angeles	12.00-12.50
Pittsburgh	21.00-21.50
St. Louis	13.50-14.00
San Francisco	14.00-14.50
Valleys	20.00-20.50

BUNDLED SHEETS

Buffalo, No. 1	17.50-18.00
Buffalo, No. 2	15.00-15.50
Cleveland	14.50-15.00
Pittsburgh	19.00-19.50
St. Louis	12.00-12.50
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	11.50-12.00
Cincinnati dealers	10.50-11.00
Detroit	†12.00-12.50
St. Louis	10.50-11.00
Toronto, dealers	6.75- 7.00

BUSHELING

Buffalo, No. 1	17.50-18.00
Chicago, No. 1	16.00-16.50
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	12.00-12.50
Detroit, No. 1, new	†15.50-16.00
Valleys, new, No. 1	18.75-19.25
Toronto, dealers	5.00- 5.50

MACHINE TURNINGS (Long)

Birmingham	7.50
Buffalo	11.50-12.00
Chicago	10.50-11.00
Cincinnati, dealers	6.50- 7.00
Cleveland, no alloy	11.50-12.00
Detroit	†9.25- 9.75
Eastern Pa.	14.00-14.50
Los Angeles	4.00- 5.00
New York	†8.00- 8.50
Pittsburgh	14.50-15.00
St. Louis	7.00- 7.50
San Francisco	5.00
Toronto, delaers	6.00- 6.25
Valleys	12.50-13.00

SHOVELING TURNINGS

Buffalo	14.00-14.50
Cleveland	12.50-13.00
Chicago	10.50-11.00
Chicago, spcl, anal.	12.50-13.00
Detroit	†11.75-12.25
Pitts., alloy-free	17.00-17.50

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†6.75- 7.50
Buffalo	11.50-12.00
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Eastern Pa.	12.50-13.00
Detroit	†9.25- 9.75
New York	†8.00- 8.50
Pittsburgh	13.50-14.00
Toronto, dealers	5.50- 6.00

AXLE TURNINGS

Buffalo	17.50-18.00
Boston district	†10.50-11.00
Chicago, elec. fur.	17.50-18.00
East. Pa. elec. fur.	16.50-17.00
St. Louis	13.50-14.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†9.50- 9.75
Buffalo	11.50-12.00
Chicago	9.50-10.00
Cincinnati, dealers	5.50- 6.00
Cleveland	12.00-13.00
Detroit	†9.25- 9.75
E. Pa., chemical	14.50-15.00
New York	†8.00- 8.50
St. Louis	7.00- 7.50
Toronto, dealers	5.50- 5.75

RAILROAD SPECIALTIES

Chicago	21.00-21.50

ANGLE BARS—STEEL

Chicago	19.50-20.00
St. Louis	20.50-21.00

SPRINGS

Buffalo	22.00-23.00
Chicago, coil	21.00-21.50
Chicago, leaf	20.50-21.00
Eastern Pa.	26.00-26.50
Pittsburgh	26.50-27.00
St. Louis	20.50-21.00

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	23.50-24.00
Chicago (3 ft.)	20.00-20.50
Chicago (2 ft.)	20.50-21.00
Cincinnati, dealers	21.50-22.00
Detroit	†23.50-24.00
Pitts., 3 ft. and less	26.50-27.00
St. Louis, 2 ft & less	21.00-21.50

STEEL RAILS, SCRAP

Boston district	†15.50-16.00
Buffalo	21.00-21.50
Chicago	17.50-18.00
Cleveland	22.00-22.50
Pittsburgh	23.00-23.50
St. Louis	18.00-18.50
Seattle	18.00-18.50

FROGS, SWITCHES

Chicago	17.00-17.50
St. Louis, cut	18.00-18.50

ARCH BARS, TRANSOMS

St. Louis	20.00-20.50

PIPE AND FLUES

Chicago, net	12.50-13.00
Cincinnati, dealers	12.00-12.50

RAILROAD GRATE BARS

Buffalo	12.50-13.00
Chicago, net	11.00-11.50
Cincinnati, dealers	9.00- 9.50
Eastern Pa.	17.00-17.50
New York	†13.00-13.50
St. Louis	13.00-13.50

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	21.50-22.00
St. Louis, No. 1	12.50-13.00
St. Louis, No. 2	16.50-17.00

FORGE FLASHINGS

Boston district	†12.25-12.75
Buffalo	17.50-18.00
Cleveland	17.50-18.00
Detroit	†15.00-15.50
Pittsburgh	20.00-20.50

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	21.50-22.00

LOW PHOSPHORUS

Cleveland, crops	23.50-24.00
Eastern Pa., crops	25.50-26.00
Pitts., billet, bloom, slab crops	28.00-28.50

LOW PHOS. PUNCHINGS

Buffalo	20.50-21.00
Chicago	21.00-21.50
Cleveland	20.00-20.50
Eastern Pa.	26.00-26.50
Pittsburgh	25.50-26.00
Seattle	15.00
Detroit	†17.50-18.00

RAILS FOR ROLLING
5 feet and over

Birmingham	20.00
Boston	†17.00-17.50
Chicago	20.00-20.50
New York	†18.50-19.00
Eastern Pa.	24.00-24.50
St. Louis	20.00-20.50

STEEL CAR AXLES

Birmingham	20.00-21.00
Boston district	†18.50-19.00
Chicago, net	21.00-21.50
Eastern Pa.	24.50-25.00
St. Louis	22.00-22.50

LOCOMOTIVE TIRES

Chicago (cut)	20.00-20.50
St. Louis, No. 1	17.50-18.00

SHAFTING

Boston district	†18.75-19.00
New York	†18.00-18.50
Eastern Pa.	24.50-25.00
St. Louis, 1¼-3¾".	19.50-20.00

CAR WHEELS

Birmingham	13.50-14.00
Boston dist., iron	†15.00-15.50
Buffalo, steel	21.50-22.00
Chicago, iron	17.50-18.00
Chicago, rolled steel	20.00-20.50
Cincin., iron, deal.	18.00-18.50
Eastern Pa., iron	21.00-21.50
Eastern Pa., steel	25.50-26.00
Pittsburgh, iron	21.00-21.50
Pittsburgh, steel	26.50-27.00
St. Louis, iron	20.00-20.50
St. Louis, steel	21.00-21.50

NO. 1 CAST SCRAP

Birmingham	13.00-13.50
Boston, No. 1 mach.	†16.50-17.00
N. Eng. del. No. 2	17.00-17.50
N. Eng. del. textile	20.00-25.00
Buffalo, cupola	18.00-18.50
Buffalo, mach.	19.00-19.50
Chicago, agri. net	14.00-14.50
Chicago, auto net	15.50-16.00
Chicago, railroad net	15.00-15.50
Chicago, mach. net	15.50-16.00
Cincin., mach. deal.	18.50-19.00
Cleveland, mach.	20.00-21.00
Detroit, cupola, net	†16.50-17.00
Eastern Pa., cupola	22.00-22.50
E. Pa., mixed yard	19.00-19.50
Los Angeles	16.00-17.00
Pittsburgh cupola	21.00-21.50
San Francisco	†12.00-13.00
Seattle	16.00-16.50
St. Louis, breakable	15.25-15.75
St. Louis agri. mach.	18.25-18.75
St. L., No. 1 mach.	19.00-19.50
San Francisco	16.00-17.00
Toronto, No. 1, mach., net, dealers	16.00-16.50

HEAVY CAST

Boston dist. break.	†14.75-15.00
New England, del.	16.00-17.00
Buffalo, break	15.50-16.00
Cleveland, break, net	15.25-15.75
Detroit, auto net	†17.50-18.00
Detroit, break.	†14.50-15.00
Eastern Pa.	19.50-20.00
Los Ang., auto, net.	14.50
New York, break	†16.00-16.50
Pittsburgh, break	17.00-17.50

STOVE PLATE

Birmingham	9.00-10.00
Boston district	†14.00-14.50
Buffalo	14.00-14.50
Chicago, net	11.00-11.50
Cincinnati, dealers	9.75-10.25
Detroit, net	†11.00-11.50
Eastern Pa.	17.00-17.50
New York, fdy.	13.00-13.50
St. Louis	12.00-12.50
Toronto dealers, net	11.00-11.50

MALLEABLE

Birmingham, R. R.	14.00-15.00
New England, del.	11.50-12.50
Buffalo	20.00-20.50
Chicago, R. R.	19.50-20.00
Cincin., agri., deal.	15.00-15.50
Cleveland, rail	23.00-23.50
Eastern Pa., R. R.	21.50-22.00
Los Angeles	12.50
Pittsburgh, rail	23.00-23.50
St. Louis, R. R.	17.00-17.50

Ores

Lake Superior Iron Ore

Gross ton, 51½ %
Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract.	9.00-10.00

Foreign Ore
(Prices nominal)

Cents per unit, c.i.f. Atlantic

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%	14.00
Chinese wolframite, short ton unit, duty paid	$23.75-25.00
Scheelite, imp.	$25.00-26.00
Newfoundland fdry. 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.00-26.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	50.00-51.00
So. African, 50-52%	50.00-51.00
Indian, 49-50%	nom
Brazilian, 48-52%	50.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 86, 87

Pittsburgh — Sheet mill operations are unchanged, with output as close to capacity as various bottlenecks will allow. Orders are about equal to production, and backlogs extend well into first quarter. First quarter prices are expected shortly, with increases almost certain on some sheet mill products. Price is of minor importance, however, with pressure on deliveries Although many customers would like to take heavier tonnages, allocations by most mills have prevented any heavy inventory stocking among fabricators and warehouses.

Cleveland—Mills still encounter difficulty satisfying all customers on deliveries. Backlogs are slow to recede despite heavy operations, although first quarter buying is somewhat less active.

Chicago—Demand is being stimulated by increased operations of automotive and farm equipment plants. Forward buying has declined, but a large part of first quarter capacity already has been absorbed.

New York — Somewhat less pressure is noted in demand for sheets, particularly for the more advanced positions. However, once first quarter prices are definitely announced, it is believed there will be a spurt in warehouse buying, as distributors have generally held off, pending some definite word as to quotations. In view of the sharp increase in price of zinc this fall, some trade interests would not be surprised if there were an advance in galvanized sheets, as an exception to the general rule.

Prices on export business continue firm, with 3.55c, f.a.s., prevailing on No. 24 black sheets.

Philadelphia—A local railroad car builder has booked 28 stainless steel passenger cars for Portugal and 15 for domestic roads. A backlog of 49 cars existed previously. Two district automotive body plants are averaging two shifts daily. Some hot-rolled and galvanized sheet mills still can make deliveries on new business this year, but most sellers are booked into first quarter.

Buffalo — Orders for first quarter delivery are increasing. Mills report domestic consumers continue to clamor for shipments, despite indications no appreciable markup, if any, is pending on next quarter prices. Increased export orders are looked upon as a possible factor for deferring future shipments. For this reason buyers are placing orders early.

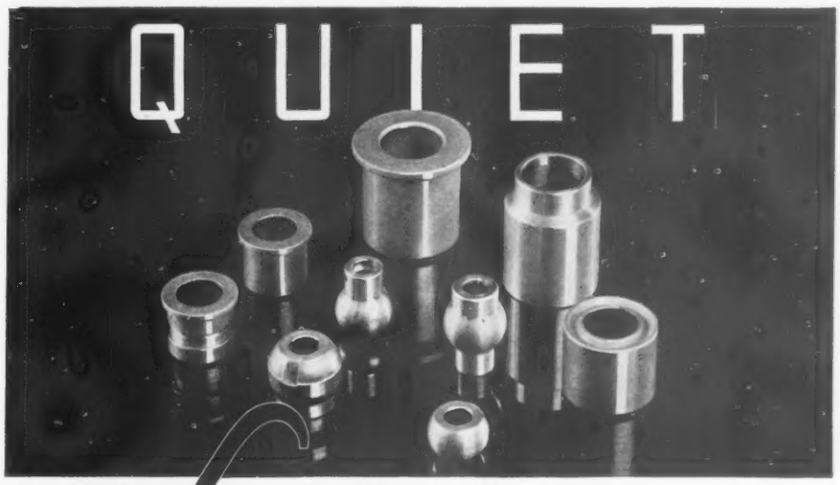
St. Louis — Production of sheets continues at the high rate which has obtained since mid-September. Deliveries are still considerably in arrears, and pressure is being placed to speed shipments. Orders for next quarter are being booked in considerable volume.

Birmingham, Ala. — A steadily growing backlog is evident in sheets, due to continued demand for both roofing and manufacturers' sheets, which are being turned out virtually at capacity. Strip continues active and consists mostly of cotton ties.

Plates

Plate Prices, Page 86

New York—Specifications are expected to be enlivened shortly by releases for freight cars ordered recently. A heavy potential backlog also exists in shipwork, release of



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Our exclusive process of PRE-ALLOYING the basic metals prevents the formation of harmful oxides . . . assures uniform structure throughout the bearing. Likewise, it permits the introduction of lead which provides quick, easy conformability and prevents galling or freezing to the shaft. Add to this the fact that LEDALOYL contains oil . . . up to 35% by volume . . . and you realize why LEDALOYL operates so *quietly*, so efficiently and for such a long period of time.

LEDALOYL is the only self-lubricating bearing with *controlled lubrication*. Millions of pores, evenly spaced, provide pin-point lubrication to the entire bearing area. The minute size of the pores *meters* the lubricant in the exact amount required for efficient operation at all speeds and loads. Likewise, the bearing absorbs the oil when the shaft is at rest. Thus you have the right amount of oil . . . in the right place . . . at the right time.

Why not try LEDALOYL on your next application. Test it in comparison to any bearing you have ever used. Compare the operating record . . . the operating temperature . . . the life and the load carrying capacity. Convince yourself that LEDALOYL is the ideal self-lubricating bearing. Your inquiry carries no obligation.

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JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

550 S. MILL STREET • NEW CASTLE, PA.

which for vessels awarded late in the summer and early fall still is awaited in most cases. Specifications elsewhere are spotty, little coming from oil companies. Some plate makers still can take additional business for delivery before end of the year.

Export prices of 2.70c and 2.80c, f.a.s., on tank and ship plates, respectively, are being shaded, with less foreign pressure for tonnage evident.

Cleveland—Plate producers are in a somewhat better position regarding deliveries. Some mills are able to make shipments within four to six weeks, or possibly sooner in urgent cases.

Philadelphia — Minimum delivery on universal plates is about four weeks and on sheared plates five weeks for the smaller mills. Larger interests are able to offer little tonnage until January. Light tank fabricators are operating at 80 per cent. Considerable tonnage still is pending for shipbuilders. Moderate export business is reported from Holland.

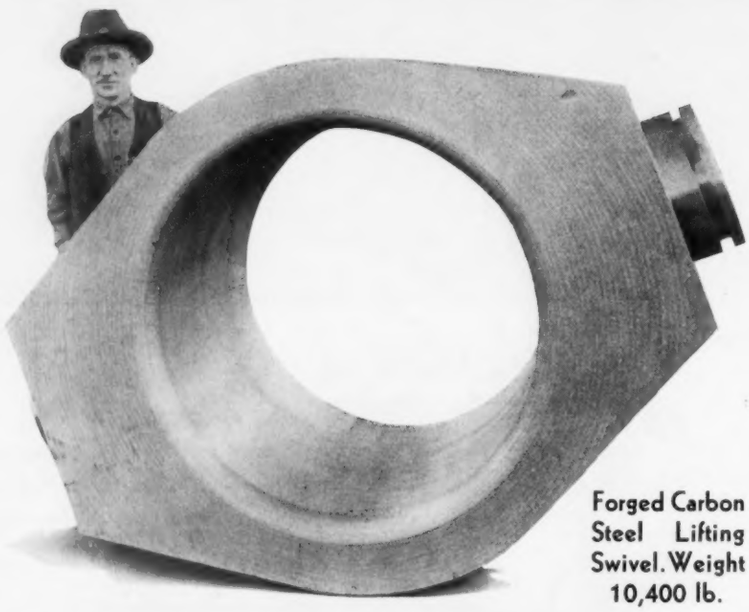
Birmingham, Ala. — Demand continues good as tonnage is supplied to car builders and tank manufacturers, with a considerable volume for miscellaneous use. Railroad repair shops also are taking much plate tonnage.

Seattle — Business is slow with plate fabricators although inquiry for small jobs is improved. No large projects are up for figures, most important being a caisson for Bonneville dam, tonnage unstated, bids Dec. 1.

San Francisco — Western Pipe & Steel Co. booked the largest plate order, 300 tons for nine smokestacks for the new plant at Avon, Calif., for Pacific Gas & Electric Co. Awards totaled 520 tons, bringing the year's aggregate to 90,326 tons, compared with 38,382 tons for the same period a year ago.

St. Louis—Demand is up moderately, principally because of heavier needs of boiler shops, makers of railroad equipment and miscellaneous users. Barge and towboat builders apparently are covered on early needs.

SPECIFY "Standard" FOR QUALITY



Forged Carbon Steel Lifting Swivel. Weight 10,400 lb.

UNUSUAL FORGINGS

Forgings of unusual size or character are nothing new for "Standard." Such work constitutes a regular and well-established part of the business.

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WROUGHT STEEL WHEELS

Standard
STEEL WORKS COMPANY
Subsidiary of The Baldwin Locomotive Works
GENERAL SALES OFFICE: PHILADELPHIA, PA.
District Offices
NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO PORTLAND, ORE.

Plate Contracts Placed

300 tons, nine smokestacks for Pacific Gas & Electric Co., Avon, Calif., to Western Pipe & Steel Co., San Francisco.

100 tons, 20-in. shore pipe, United States engineer office, Sacramento, Calif., to Pacific Coast Engineering Co., Oakland, Calif.

Unstated tonnage 150,000-gallon elevated tank, Fort Screven, Ga., to R. D. Cole Mfg. Co., Newnan, Ga., $15,800, bids Oct. 24.

Unstated tonnage, 200,000-gallon elevated tank, Fort Benning, Ga., to R. D. Cole Mfg. Co., Newnan, Ga., $14,000, bids Oct. 20.

Plate Contracts Pending

700 tons, 24-inch welded steel pipe, Burbank, Calif., reported in error last week as going to Consolidated Steel Corp., Los Angeles; bids were rejected and new bids close Nov. 21.

Bars

Bar Prices, Page 86

Cleveland—Buyers are calling for deliveries in unabated volume, and pressure on mills gives no signs of early slackening. Despite the revised price outlook heavy schedules are assured through December. A fair amount of business is at hand for first quarter shipment.

Chicago — Increased production of farm equipment has boosted bar demand, while automotive needs also have moved higher. Remaining tonnage is unusually well diversified. Coverage for first quarter is heavy, although buying has eased off slightly. Freight car requirements are high, with mills feeling

pressure for early delivering. Warehouse distributors are taking large tonnages in attempts to keep incoming tonnage at the same rate as their own bar shipments.

New York — Steel bars continue active, some consumers exerting all possible pressure for deliveries, in view of the shortage in wire rods. Forward buying is less active.

Philadelphia — Requirements continue heavy, although some tapering is noted in specifications for railroad repairs. Deliveries still are extended on hot-rolled and cold-drawn carbon and alloy grades.

Birmingham, Ala. — Bars continue one of the most active specifications, with some improvement in buying by producers of farming implements. Some business for first quarter delivery is on books.

Buffalo—Pressure for delivery is so urgent that some mills are extending operations to seven days a week. Fear of a sharp price advance is less evident, but this is not reflected in requests for prompt shipments. A substantial tonnage already is on producers' books for first quarter delivery.

Pipe

Pipe Prices, Page 87

Cleveland—Demand is spotty but active as a whole. Merchant pipe continues in relatively better call than oil country goods, reflecting improved building construction. Line pipe production is fairly heavy, and mechanical tubing is moving well.

Chicago — Cast pipe continues rather quiet, only small lots being involved in new construction. The next section of the local subway will take 100 tons, and 115 tons is pending for Jackson, Mich. Chicago has yet to place 2410 tons on which it has bids.

Birmingham, Ala. — New business in pipe, mostly for municipal use, and largely from Pacific coast points, is in sufficient volume to maintain production.

Seattle — Pending business is at the lowest ebb in months and indications are not promising for important orders before the first quarter. Placements in the last three months have been better than normal and have rounded out a fair year.

San Francisco — Movement of cast iron pipe continues quiet and only one award of size was reported. No new inquiries of importance developed during the past week. Awards aggregated 227 tons and brought the total for the year to 35,368 tons, compared with 29,135 tons for the corresponding period in 1938.

Steel Pipe Placed

Unstated tonnage, 1,400,000 feet, 1-inch black pipe, bureau of reclamation, invitation 33,343-A, for delivery at Coram, Calif., to National Electric Products Co., Pittsburgh.

Steel Pipe Pending

Unstated, 500,000 feet, 1-inch and 40,000 couplings for Bonneville dam, delivery Odair, Wash.; bids in to Denver, Nov. 13.

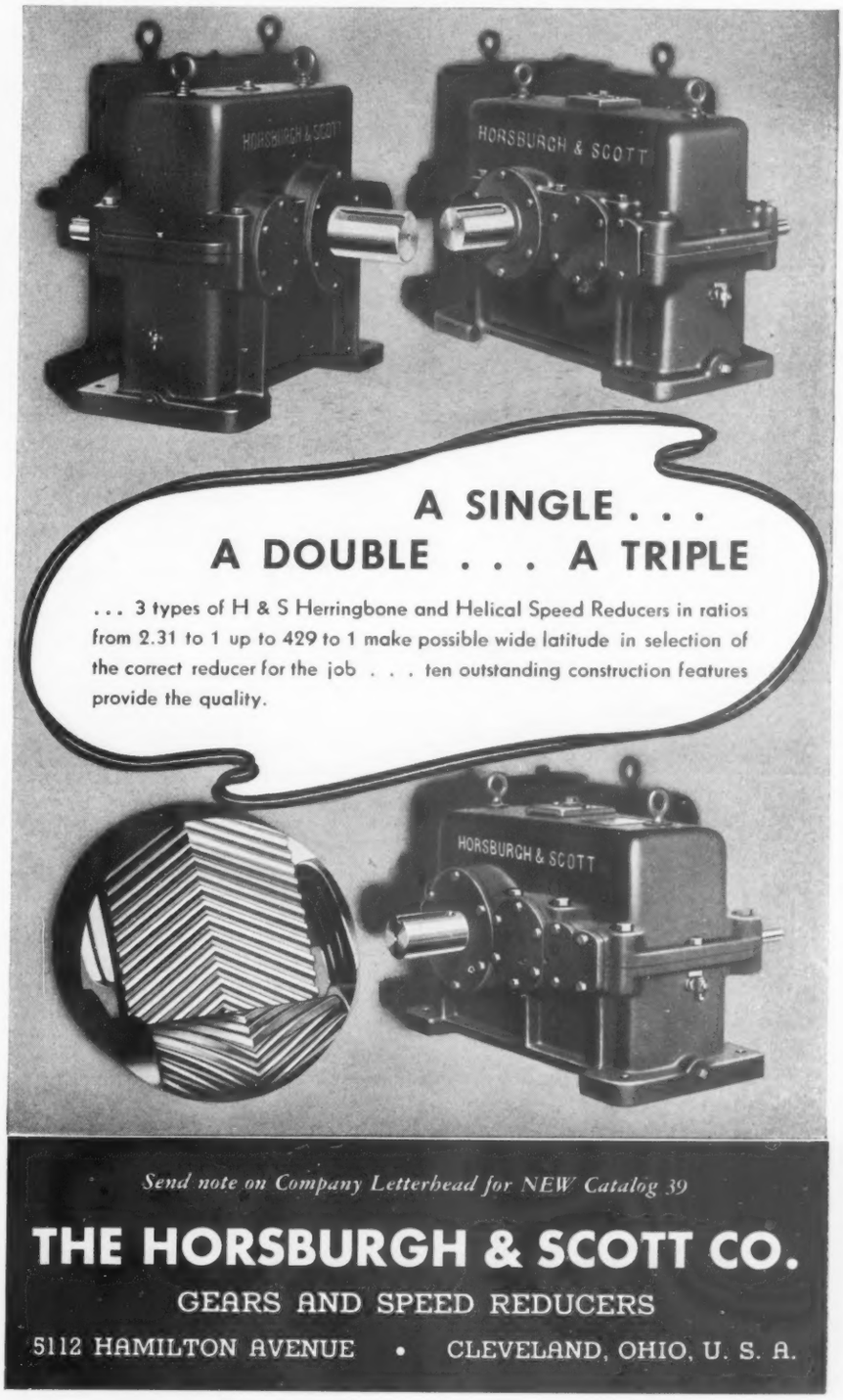
Cast Pipe Placed

270 tons, improvements at Sunnyside and Quincy, Wash., to Central Foundry Co., Birmingham, Ala.

190 tons, 16-inch, improvement of Sand Point Way, Seattle, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

115 tons, pipe and fittings, city water works, Jackson, Mich.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THE HORSBURGH & SCOTT CO.
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5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Wire

Wire Prices, Page 87

Pittsburgh — Commitments for first quarter in manufacturers wire are now being backed up by releases and specifications, and it is certain some grades will shortly be filled for first quarter delivery. Deliveries are well behind releases, and both in manufacturers and merchant markets delivery problems are acute. Incoming orders are balancing shipments, and in some cases running ahead. This means backlogs are not diminishing.

Chicago — Wire interests are accepting first quarter business from regular customers, providing material is definitely specified. Prices will be those prevailing when shipment is made. Mills are not encouraging new business, preferring to wait till price cards are out for next quarter, but some customers' schedules require early coverage and have been accommodated. Price is not a factor in new buying, producers say. Mills are well filled this quarter and taking only a few small fill-ins or orders made possible by minor adjustments in production. Difficulty arises from time to time in obtaining billets.

Birmingham, Ala. — Mills are booked through this quarter on wire and nails, and operation at the Fairfield mill is estimated at better than 90 per cent. Considerable tonnage is expected to be carried over into first quarter.

Andrews

ANDREWS STEEL

IRON AND STEEL products

BLOOMS • FORGING BILLETS • RE-ROLLING BILLETS • SLABS • UNIVERSAL MILL PLATES • SHEET BARS

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NEWPORT, KENTUCKY
DIVISIONS
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THE GLOBE IRON ROOFING & CORRUGATING CO.

Rails, Cars

Track Material Prices, Page 87

Railroad buying seems to have come practically to a close, New York Central's award of 64,000 tons of rails and fastenings to four suppliers being the only letting of importance last week. Accessories were divided among 21 manufacturers. Relatively little rail or rolling stock inquiry remains before the market.

Some foreign business has been booked recently, a Brazilian railroad having placed 14,000 tons of rails with Carnegie-Illinois Steel Corp. and a Portuguese road awarding 28 stainless steel passenger cars with Edward G. Budd Mfg. Co.

Rail Orders Placed

Brazilian railway, 14,000 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

New York Central, 64,000 tons rails and accessories to Bethlehem Steel Co., Bethlehem, Pa., Carnegie-Illinois Steel Corp., Pittsburgh, Inland Steel Co., Chicago, and Algoma Steel Corp., Sault Ste. Marie, Ont.

Car Orders Placed

Companhia dos Caminos de Ferro Portuguesses, Portugal, 28 stainless steel light-weight passenger cars, to Edward G. Budd Mfg. Co., Philadelphia.

Newburgh & South Shore, 100 fifty-ton gondolas to Magor Car Corp., Clifton, N. J.

Car Orders Pending

Lake Erie Terminal, 100 to 200 gondolas; bids asked.

Buses Booked

American Car & Foundry Motors Co., New York: Thirty 35-passenger and eight 39-passenger for Eastern Massachusetts Street Railway Co., Boston; seven 36-passenger for Memphis Street Railway Co., Memphis, Tenn.; six 36-passenger and four 37-passenger for Florida Motor Lines Corp., Jacksonville, Fla.; five 36-passenger for United Electric Railways Co., Providence, R. I.; two 37-passenger for Avery's Garage, Highland Falls, N. Y.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 87

Bolt and nut production continues

at a high rate, with automotive specifications an increasingly important factor in demand. More work is expected to be released shortly by car builders to accommodate heavy orders received recently. Some bolt and nut makers are having difficulty obtaining sufficient supplies of rods and bars.

Shapes

Structural Shape Prices, Page 86

Pittsburgh — Structural inquiries are numerous and well divided between private needs and public works. Awards are slower, with pending tonnage increasing. Despite some delays in deliveries of plain shapes, the flow of material generally has been satisfactory.

Cleveland—Plain shape deliveries are improving, shipment now being available within three to four weeks. Inquiries for fabricated material are confined mostly to small jobs, one exception being 2500 tons for the municipal light plant here.

Chicago—Structural demand is fairly active, although public projects are fewer. Private enterprises are becoming more active. Railroads are becoming a more important factor in shape consumption through freight car and bridge building.

Philadelphia—Fort Pitt Bridge Works is reported low on 2100 tons of fabricated shapes and Bethlehem Steel Co. is reported low on 3500 tons for the Panama canal, bids Nov. 15. New work is relatively light.

Seattle—Better demand for small tonnages involved in private construction jobs is reported. Shops have considerable work in hand. Largest placement of the week went to American Bridge Co., about 1000 tons for the 107-mile steel tower power line between Kelso and Seattle, Wash., low bidder at $380,221.

San Francisco — Featuring the structural market was the award of 1000 tons of sheet steel piling and 500 tons of H columns for the second graving dock at the Bremerton, Wash., navy yard, taken by Bethlehem Steel Co. Awards totaled 4965 tons, bringing the aggregate to date to 146,520 tons, compared with 134,947 tons for the same period last year.

St. Louis—Demand for structural steel continues to lag behind other steel commodities. Fabricating yards have slightly reduced operations and backlogs are smaller than a month ago. Pending projects are not large.

Shape Awards Compared

	Tons
Week ended Nov. 18	**18,736**
Week ended Nov. 11	**25,105**
Week ended Nov. 4	**27,360**
This week, 1938	**17,678**
Weekly average, year, 1938	**21,568**
Weekly average, 1939	**22,688**
Weekly average, October	**21,730**
Total to date, 1938	**931,755**
Total to date, 1939	**1,043,645**

Includes awards of 100 tons or more.

Shape Contracts Placed

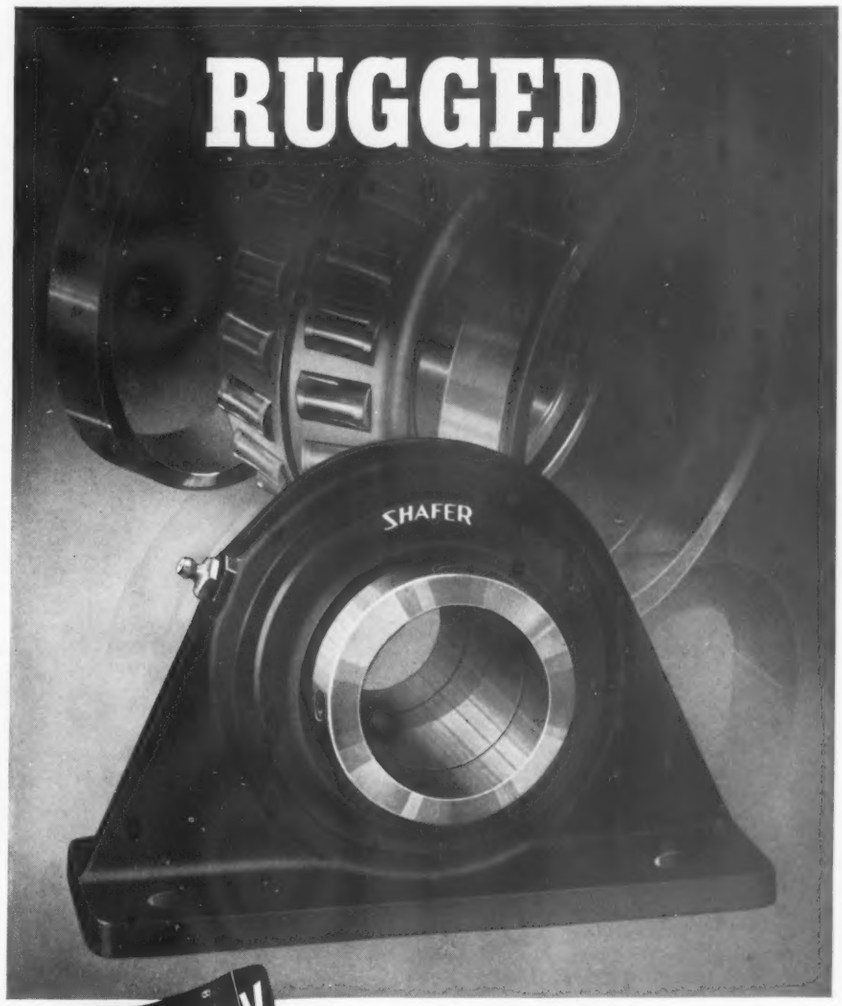
2400 tons, piling, Cuyahoga river straightening, Cleveland, to Carnegie-Illinois Steel Corp., Pittsburgh; Great Lakes Dredge & Dock Co., Cleveland, general contractor.

2125 tons, bridge project, Calumet, La., to Mt. Vernon Bridge Co., Mt. Vernon, Ill.

1950 tons, 320 transmission towers for TVA, Cleveland, Tenn., to American Bridge Co., Pittsburgh.

1500 tons, sheet piling, including 500 tons H columns, second graving dock navy yard, Bremerton, Wash., to Bethlehem Steel Co., Seattle.

1200 tons, Fort Peck dam, Wiota, Mont., to Bethlehem Steel Co., Bethlehem,



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Available in a full range of sizes: Pillow Blocks · Welded Steel Pillow Blocks · Flange Units · Take-up Units · Hanger Boxes · Cartridge Units · Flange Cartridge Units Duplex Units · Conveyor Rolls Radial-thrust Roller Bearings

SHAFER WELDED STEEL HOUSINGS provide compact and exceptionally rugged mountings for the rugged Shafer radial-thrust roller bearing. Both standard duty and super-sealed pillow blocks are available in this type. The Shafer Concave roller design combines self-alignment, radial-thrust capacity, and simple adjustability as inherent features of the bearing itself.

SHAFER BEARING CORPORATION
35 EAST WACKER DRIVE • CHICAGO, ILLINOIS

SHAFER *Radial-thrust* **ROLLER BEARINGS**

Pa.

800 tons, Stinson Aircraft division Aviation Mfg. Corp., factory and office at Nashville, Tenn., to International Steel Co., Evansville, Ind.

600 tons, Savanna, Ill., government powder magazines, to Gage Structural Steel Co., Chicago.

450 tons, turbine supports, for Public Service Electric & Gas Co., Burlington, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

440 tons, bridge 443A (4), Randolph county, Arkansas, to Clinton Bridge Works, Clinton, Iowa.

360 tons, bridge, 1-VF1, McLean county, Bloomington, Ill., to A. F. Anderson Iron Works, Chicago.

360 tons, bridge SAP-673-B, Harmon county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

355 tons, building, General Electric Co., Chicago, to American Bridge Co., Pittsburgh.

330 tons, bridge SAP-812-E, Custer and Roger Mills counties, Oklahoma, to Patterson Steel Co., Tulsa, Okla.

326 tons, addition, postoffice and court house, Lincoln, Nebr., to Omaha Steel Works, Omaha; Olson Construction Co., Lincoln, contractor.

325 tons, bridge FAP-287-A, Kay county, Oklahoma, to Kansas City Structural Steel Co., Kansas City, Kans.

300 tons, factory building, Fruehauf Trailer Co., Los Angeles, to Pennsylvania Iron & Steel Co.

300 tons, bridge FAS-30A(1), Latimer county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

270 tons, bridge SAP-874-A, Latimer county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

250 tons, bridge T-124, Mapleton, Iowa, to American Bridge Co., Pittsburgh.

245 tons, addition to warehouse, for Owens-Corning Fibre Glass Co., Newark, O.; 130 tons to C. E. Morris Co., Columbus, O., and 115 tons to Indiana Bridge Co., Muncie, Ind.

240 tons, Klamath river bridge, Humboldt county, Calif., for state, to Judson-Pacific Co., San Francisco.

240 tons, bridges 5793 and 5869, Minnesota City, Minn., for state, to Bethlehem Steel Co., Bethlehem, Pa.

225 tons, building for Resinous Products Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through Frank V. Warren Co., Philadelphia.

225 tons, bridge FAS-458-B (1), Coal county, Oklahoma, to Capitol Steel & Iron Co., Oklahoma City, Okla.

200 tons, factory building, for Chicago Extruded Metals Co., Cicero, Ill., to Midland Structural Steel Co., Cicero, Ill.

200 tons, Kaiser Ducett Co. factory building, Chicago, to Midland Structural Steel Co., Chicago.

180 tons, extension to stripper building, for Republic Steel Corp., Cleveland, to Lackawanna Steel Construction Corp., Buffalo, N. Y.

175 tons, state bridge, Rossville, Ill., to Midland Structural Steel Co., Cicero, Ill.

170 tons, Duke Power Co., stack, flues and ducts, Bride, N. C., to Carolina Steel & Iron Co., Greensboro, N. C.

150 tons, telephone building for Pacific Telephone & Telegraph Co., Albany, Calif., to Moore Drydock Co., Oakland, Calif.

150 tons, curbs, East River drive, contract No. 4, Grand street, New York, to Egleston Bros. & Co., New York.

150 tons, bridge, Brown county, Ohio, to Fort Pitt Bridge Works, Pittsburgh.

150 tons, roof and supports, Eureka Pipe Line Co., Morgantown, W. Va., to Miles P. Brown Boiler Works, Franklin, Pa.

140 tons, factory building, St. Marys Mfg. Co., St. Marys, O., to American Bridge Co., Pittsburgh.

130 tons, Simonds Saw & Steel Co., heat-treating and storage buildings, Lockport, N. Y., to the Austin Co., Cleveland.

125 tons, bridge FAGH-37-4, Lowell, N. C., to Southern Engineering Co., Charlotte, N. C.

125 tons, truss and girder bridge spans, Iowa, to Milwaukee Bridge Co., Milwaukee.

120 tons, state bridge, contract 1841, Valparaiso, Ind., to American Bridge Co., Pittsburgh.

120 tons, bridge 2095, job 3263, Texarkana, Ark., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

110 tons, bridge FAS-139A, Gillespie county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.

110 tons, barrel factory, Rheem Co., Newark, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

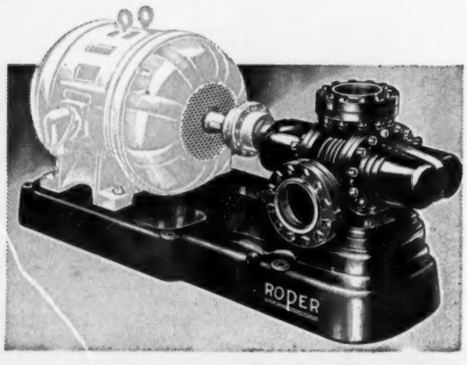
110 tons, state bridge FAS-218, Battle Creek, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

105 tons, repairs to bridges, Chicago, for Chicago, Milwaukee, St. Paul & Pacific railroad, to Bethlehem Steel Co., Bethlehem, Pa.

Service
IN EVERY SENSE OF THE WORD

In that one simple statement, pump users the country over sum up their experience with DEPENDABLE Roper Rotary Pumps. Some like the Roper SIMPLICITY of design, EASE of installation and LARGE capacity. Others know that they have profited from the LOW original cost, LONG life, LOW operating cost, LOW maintenance cost and TROUBLE-FREE performance. If you are interested in any of these features —write for latest bulletin on Roper Pumps.

ROPER Rotary PUMPS
DEPENDABLE - SINCE 1857



GEO. D. ROPER CORPORATION
Rockford — Illinois

Offices
Pittsburgh and other Principal Cities

100 tons, Cuno H. Rudolph school, Washington, to Barber & Ross Inc., Washington; Jeffress-Dyer, Washington, contractor; Hudson Supply Co., Washington, awarded 65 tons, reinforcing steel.

100 tons or more, 3-story dormitory, Norwich University, Northfield, Vt., to Lyons Iron Works Inc., Manchester, N. H.; W. H. Trumbull Co., Hanover, N. H., contractor. Truscon Steel Co., Youngstown, O., awarded reinforcing steel.

Shape Contracts Pending

12,000 tons, shapes, H columns and sheet piling, two drydocks, specification 9100, Pearl Harbor, T. H.; bids Dec. 20.

3300 tons, steel conduit lining and 490 tons, steel gates for outlet works structures, Dennison dam, near Dennison, Tex., United States engineers office, Dennison, Tex.; bids Dec. 15.

3160 tons, seven buildings, Consolidated Aircraft Corp., San Diego, Calif.; Consolidated Steel Corp., low.

3000 tons, concentrating plant, Consolidated Copper Co., Kimberly, Nev.; bids soon.

2500 tons, municipal light plant expansion, Cleveland; bids Dec. 1.

1600 tons, naval medical center tower, Washington, for navy.

1500 tons, state hospital building, Willowbrook, N. Y.

1200 tons, bridge 860, Maybeury, W. Va., for Norfolk & Western railroad.

815 tons, aeronautical laboratory and office, Philadelphia navy yard; Ralph S. Herzog, Philadelphia, low on general contract; also 650 tons reinforcing bars.

800 tons, building, for Vulcan Detinning Co., Neville Island, Pittsburgh.

700 tons, skating rink, for M. J. Uline, Washington.

700 tons, addition to boiler house, for Iowa Electric Light & Power Co., Cedar Rapids, Iowa.

600 tons, Woolworth store building, for Levi-Tyler Land Co., Louisville, Ky.

600 tons, replacing bridges, for Norfolk & Western railroad, Clinch Valley, Va.

550 tons, building and shelters, for Electric Boat Co., Bayonne, N. J.

500 tons, bridges, Winston, N. C., for Norfolk & Western railroad.

500 tons, various structures, for Railway Express Agency, New York.

450 tons, building for Catalytic Development Co., Chester, Pa. Henry E. Baton, Philadelphia, general contractor; also 50 tons reinforcing bars.

400 tons, laboratory building, Peoria, Ill., for department of agriculture.

375 tons, state bridge, Crystal Lake, Ill.

375 tons, laboratory building, Wyndmoor, Pa., for department of agriculture.

300 tons, navy air base improvement at Tongue Point, Oreg.; bids Nov. 28.

300 tons, building 38, for Cincinnati Chemical Works, St. Bernard, O.

295 tons, addition Waterside Station No. 2, Consolidated Edison Co., New York.

250 tons, two highway bridges, state of Arkansas; bids Nov. 28.

250 tons, gymnasium, Northwestern university, Evanston, Ill., R. C. Wieboldt Co., Chicago, general contractor.

250 tons, state bridge, Georgetown, O.

210 tons, generator foundation, for Narragansett Electric Co., Providence, R. I.

200 tons, fire control building, Frankford arsenal, Philadelphia; bids Nov. 21.

200 tons, office building and hangar, Wold-Chamberlain airport, Minneapolis, for city.

180 tons, state bridge FAP-159-I (1), Riverton, Wyo.

175 tons, state bridges, Channahon, Ill.

175 tons, grade separation, Hardin county, Ohio, for state.

170 tons, building, for Community Church of New York, New York.

170 tons, addition to plant, for Hygienic Tube & Container Corp., Newark, N. J.

170 tons, extension to open hearth building, for Pittsburgh Crucible Steel Co., Midland, Pa.

170 tons, grade separation, Batavia, O., for state.

150 tons, reconstruction of Appleton dam, Milwaukee, government engineers, bids Nov. 21.

150 tons, addition to building D, for Ciba Pharmaceutical Products Inc., Summit, N. J.

125 tons, addition to office building, for Union Central Life Insurance Co., Cincinnati, O.

152 tons, including 178-foot two-span I-beam bridge, Mill river, East Wallingford, Vt., and 79-foot I-beam bridge, Ryegate, Vt.; bids Nov. 24 and 22 respectively; H. E. Sargent, commissioner of highway, Montpelier.

115 tons, contact plant, for Standard Oil Co. of New Jersey, Bayway, N. J.

110 tons, warehouse, for Hills Bros.

Thomastrip Advancements Have Spurred Product Improvement

Thomas Strip

By constant study of products made from Cold Rolled Strip Steel, Thomas Engineers very frequently uncover opportunities for new qualities and economies by furnishing manufacturers with steels more closely adapted to their needs.

Special tempers more suitable to the fabricating process; accurate gauges that promote savings; precoated steels that speed production and lower costs—these are a few examples of Thomas advancements that economize product production and spur product improvement.

We suggest that you discuss your production problems with a Thomas representative.

BRIGHT FINISH UNCOATED, AND ELECTRO COATED IN NICKEL, ZINC, COPPER, BRASS, BRONZE AND TIN

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

Coffee Inc., Edgewater, N. J.

110 tons, reinforcing building, for Bigelow-Sanford Carpet Co., Amsterdam, N. Y.

100 tons, bridge, East St. Louis, Ill., bids Nov. 21.

100 tons, housing project, Camden, N. J.; bids postponed to Dec. 8.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh — Inquiries continue relatively heavy for the season, and orders are active. Prices continue strong, with an extension into first quarter expected. Some delivery problems continue to be encountered.

Chicago—Inquiries are light, but mills are well booked and potential demand is sustained. Another 12,000 tons is expected to be involved in a second section of the city's south side filtration plant.

Philadelphia—Ralph S. Herzog, Philadelphia, is low on an aeronautical laboratory and office, Philadelphia navy yard, requiring 650 tons of bars and 815 tons of shapes. Several smaller jobs also are pending.

Seattle—New business is light but rolling mills have backlogs to carry them to the end of the quarter. Increased general construction has created improved demand for lots of less than 100 tons. Award of 1850 tons for the graving dock at Puget Sound Navy yard to Bethlehem Steel Co., Seattle, is announced.

San Francisco — Awards aggregated 2213 tons and brought the year's total to 149,902 tons as compared with 129,131 tons for the corresponding period in 1938. Pending business exceeds 3500 tons and bids will be opened on Dec. 20 for two drydocks at Pearl Harbor, calling for more than 1000 tons.

Handling FERROMANGANESE from cars to stock pile this Blaw-Knox Bucket unloads an average of 7 cars per eight hour shift. The former cost of $.65 per ton was *reduced* to $.25 per ton.

This bucket handles LIMESTONE in pieces ranging from 6" to 12" from dock to 50-60 ton gondola, filling car in an average time of 20 minutes.

It unloads SPIEGEL from 50-60 ton car in 1½ hours without teeth, and handles PIG IRON from stock pile at the rate of about ¾ Cu. Yds. per grab.

Blaw-Knox Buckets are designed to meet Steel Mill requirements—put your bucket problems up to Blaw-Knox.

BLAW-KNOX *Digging and Rehandling* **BUCKETS**

BLAW-KNOX DIVISION
• OF BLAW-KNOX CO. •
Farmers Bank Bldg. Pittsburgh, Pa.

Reinforcing Steel Awards

3230 tons, Central Valley project, California, to Bethlehem Steel Co., San Francisco, at $160,422.

1850 tons, graving dock No. 4, Puget Sound navy yard, Washington state, to Bethlehem Steel Co., Seattle; Macco Construction Co. and Case Construction Co., Clearwater, Calif., general contractors.

500 tons, barracks, Lowry field, Denver, to Colorado Fuel & Iron Corp., Denver; Mead & Mount, contractor.

493 tons, bureau of reclamation, Invitation 46, 802-A, Rutledge, Texas, to Colorado Fuel & Iron Corp., Denver.

350 tons, housing, Lexington, Ky., to Pollak Steel Co., Cincinnati; George H. Rommel Co., contractor.

300 tons, distribution tunnels, Champaign, Ill., to Laclede Steel Co., St. Louis; Lyman Construction Co., contractor.

275 tons, penitentiary cell blocks, Richmond, Va., to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co.

255 tons, bureau of reclamation, Invitation 46,807-A, Rutledge, Tex., to Sheffield Steel Corp., Kansas City, Mo.

246 tons, post and depot supply warehouse, Hickam Field, T. H., to Bethlehem Steel Co., San Francisco.

150 tons, powder and ammunition magazines, Savanna, Ill., for United States government, to Laclede Steel Co., St. Louis; Manhattan Construction Co., Muskogee, Okla., contractor.

100 tons, addition, post office and court house, Lincoln, Nebr., to General Steel Products Co., Lincoln; Olson Construction Co., Lincoln, contractor.

100 tons, addition, assembly shop, naval

Concrete Bars Compared

	Tons
Week ended Nov. 18	**7,849**
Week ended Nov. 11	**8,712**
Week ended Nov. 4	**16,514**
This week, 1938	**5,738**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**9,851**
Weekly average, October	**10,421**
Total to date, 1938	**307,096**
Total to date, 1939	**453,165**

Includes awards of 100 tons or more.

station, Newport, R. I., to Bethlehem Steel Co., Bethlehem, Pa.; Tredennick-Billings Co., Boston, general contractor.

Reinforcing Steel Pending

10,750 tons, outlet works structures of Dennison dam, near Dennison, Tex.; United States engineer's office, Dennison, Tex.; bids Dec. 15.

1450 tons, schedule 3709, Panama Canal; bids Nov. 10.

1000 tons, seven buildings, Consolidated Aircraft Corp., San Diego, Calif.; Consolidated Steel Corp., Los Angeles, low.

653 tons, including 120 tons mesh, bridge at Washington street and Sixth avenue, San Diego, Calif., for state; bids Nov. 30.

350 tons, addition to high school, Berkeley, Calif.; bids opened.

260 tons, Washington state highway projects; bids in at Olympia.

200 tons, Forest Hills high school, Rego Park, N. Y.; bids Nov. 17.

200 tons, garage and stores, Twelfth and Chestnut streets, board of city trusts, Philadelphia; bids Nov. 29.

190 tons, Bell Telephone building, Philadelphia; Henry E. Bato low.

115 tons, approaches, North State street, Chicago.

115 tons, two highway bridges, state of Arkansas, bids Nov. 28.

110 tons, building, American Maize Products Co., Roby, Ind.

110 tons, building, Deerfield Packing Co., Bridgeton, N. J.

100 tons, building, Charles Lennig, Philadelphia.

Pig Iron

Pig Iron Prices, Page 88

Pittsburgh—Producers have heavy backlogs, with buyers generally well covered. Delivery problems have not been acute since most merchant sellers have been protected by fair stocks. Of the district's 50 blast furnaces 41 are active. Coke production is tending to level off, following the lighting of additional beehive ovens which brought the number of active units to more than 5200. Iron and coke prices are steady.

Cleveland — Deliveries retain October gains and give promise of boosting the fourth quarter movement to a record level. New business is quiet, although some small orders continue to be placed. Buyers show little concern over first quarter prices.

Chicago — Shipments are 5 to 10 per cent ahead of October, although releases are tending downward as a result of heavy tonnages moved last month and in September when low-priced contracts were being completed. Buying is light, with little activity in first quarter contracting. Foundry coke shipments are about the same as a month ago.

New York — Orders and deliveries have moderated, partly attributable to likelihood of unchanged prices next quarter. Specifications from soil pipe makers are off seasonally, but machine tool foundries are the most active in years.

Cincinnati — Shipments are sustained and going largely into consumption, foundry inventories having been built up to satisfactory levels. Buying is for early delivery, there being little interest in first quarter business. Casting demand is retarded somewhat by automotive labor trouble, although jobbing plants are slightly busier and machine tool requirements continue heavy.

Philadelphia—Export demand is improving, with inquiries reported from Sweden and South America. It is reported furnaces will work in some of this tonnage, although some are booked three to four months ahead on domestic business. The export premium is about $1 a ton. England has yet to enter the market.

Buffalo — Pig iron producers are forced to draw on stocks to meet heavy specifications. Foundries are piling little iron, some reporting re-

DAMASCUS

Manganese and Alloy Steel CASTINGS

FROM ½ TO 1000 POUNDS

1906 — 33 years — 1939

Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

We are in position to manufacture specialties made of manganese and alloy steel castings and invite concerns to write us about their requirements.

DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Behind the Scenes with STEEL

Tin You?

■ The Link-Belt *News* is to be blamed for this:

"I bought a wooden whistle, but it wooden whistle.

"I bought a lead whistle, but they wooden lead me whistle.

"I bought a copper whistle, but the copper wooden lead me whistle.

"I bought a steel whistle, but steel the copper wooden lead me whistle.

"I bought a zinc whistle, but while I zinc it wood whistle

"Steel the copper wooden lead me whistle.

"So I bought a tin whistle, and now I tin whistle."

Idea For Sale

■ John Bodkin of New York gives us something really new for the fall guy mentioned here last week. It is "Double Diamond" baseball. Two diamonds are interlocked so that the home plates are right in front of each pitcher's box. Catchers are eliminated and each pitcher catches for the other pitcher, which means they are both throwing at once and two batters are up at the same time. Anyone interested further in this madhouse arrangement can get a complete diagram from Mr. Bodkin at 1775 Broadway.

The Rude Awakening

■ Last Tuesday morning it was bright and sunny here in Cleveland and we whistled our way to work with a light heart, anxious to see the morning's mail, confident that no one short of an Einstein could give us a solution to the hoses and houses. Well, gentlemen, you could have knocked us cold with an underdone cream puff as we looked aghast at diagram after diagram of nine hoses going to three houses and not one hose crossing any other. We quick grabbed last week's column for a re-reading and discovered we'd slipped an Ethiopian into our own woodpile by not specifying that no line could pass through a house. As D. L. Dunning of Sheet Metal Specialty Co. says, "When you omitted that, it was easy." (Gulp!) You're telling us, Mr. Dunning. That ninth hose was put through windows, doors, over the roof, through the cellar and even laid neatly across the center of a hydrant. Fred Chambers (National Gypsum) wired us to give Ann a brisk piggy back for thirty minutes before dinner to relieve our indigestion but now we need a good cure for a terrific headache.

The Pay-Off

■ But let it never be said that a Shrdlu welshed on a gentlemen's agreement. Fifty-two bright and shiny issues of STEEL (and not back copies) will be sent post-haste, as published, to all dear readers who sneaked in with their trick answers before the contest came to an abrupt close (at the frantic request of the circulation dept.) at the crack of dawn, Monday, November 20, 1939. Amen.

The Moral

■ *Sic eunt fata hominum*—which translated very freely means *What th' hell, such is life!* Live and learn—and we just live.

The New One

■ And so this week you are back on an amateur basis. The prize is a dead-fish handshake and a sickly grin. *Every hour on the hour a train leaves New York for Chicago and likewise every hour on the hour a train leaves Chicago for New York. Actual elapsed time both ways is exactly 24 hours. Now if you take any train in either direction, how many oncoming trains will you pass enroute, not counting the one arriving just as you leave or the one leaving just as you arrive?*

SHRDLU

ceipts about equal to the melt. Importations of Canadian coke continue, local ovens proving inadequate to fill current demand, which includes buying by producers who are building up winter stocks.

St. Louis—Daily average movement of iron so far this month is slightly ahead of October, which month was the most active in over two years. Consumption continues to gain slowly, the betterment being well distributed. Buying is mostly in small lots for prompt delivery. Little first quarter inquiry is appearing.

Birmingham, Ala. — Due to marked gain in shipping instructions and need for raw materials, all 18 blast furnaces continue at capacity. Woodward will blow out one of its stacks for air-conditioning within the next few days.

Toronto, Ont. — Merchant iron sales are sustained in lots of 50 to 300 tons. Deliveries are steady, some melters piling iron for future needs. Production holds at the year's peak, with seven stacks active, and supplies generally are ample. Prices are unchanged and firm.

Scrap

Scrap Prices, Page 90

Pittsburgh — Scrap continues weak, with buying light despite heavy mill operations. Steelworks have large scrap inventories, indicating that buying earlier this fall was heavier than generally believed. Prices are off 50 cents to $1, with No. 1 steel now $21 to $21.50. Blast furnace grades are active, and weakness has not been marked in borings or mixed turnings and borings.

Cleveland—Scrap continues quiet and fairly steady although prices are slightly above adjoining areas. Little activity is expected for a week or two as consumers consider present reserves sufficient.

Chicago — Prices have weakened further, No. 1 steel being off $1 during the week on a mill purchase at $17.50. The market now has slipped $2.50 from its fall peak. A number of other grades lately have declined an additional 50 cents. Fairly steady prices continue on railroad steel specialties and on most cast grades. A firmer market is expected to accompany resumption of more active mill demand.

Philadelphia — The market is tending lower, with scrap moving more freely and further business done in No. 1 steel at $20.50, establishing the grade at this level. Several other grades also are easier, in-

cluding No. 2 steel, cast and stove plate. The weaker situation is blamed partly on the decline in exports which now average less than 5000 tons monthly against 30,000 tons prior to the outbreak of war. Export material is bringing $19.50 to $19.75 for No. 1 and $18 to $18.25 for No. 2, Port Richmond.

Buffalo — Quotations have slipped sharply, consumer purchases of heavy melting steel showing a reduction of $1.50 for the week. Sales involved about 6000 tons, with only a small part No. 1 steel, which is none too plentiful. The market for the latter now is $19.50 to $20. Mills report sufficient stocks for early needs, with boat receipts from upper lake ports expanding.

Detroit—The market is slightly easier. Borings and turnings are off 25 cents, with busheling, bundles, loose clippings and low-phos plate down 50 cents. The softer situation is regarded as only temporary.

Cincinnati —The market is weaker, prices generally being down 50 cents. Consumer interest is slackening, with supplies on hand adequate for remainder of the quarter. Inquiries from foundries are lighter.

St. Louis—Except for a moderate sale of No. 2 steel to a district mill, the market is quiet. Price paid on this purchase was 25 cents below the preceding sale. Consumption is sustained, but scrap inquiries from both mills and foundries are light.

Seattle—Export movement is fairly steady but small tonnages prevail. Good material continues scarce at tidewater and dealers are interested in all offerings. Present high prices have stimulated increased receipts from back country. Rolling mills are buying as needs develop but foundry demand is nominal.

Toronto, Ont.—Higher prices have resulted in increased scrap offerings, and supplies are fairly large. However, No. 1 cast and heavy melting steel continue scarce, although dealers do not look for any general shortage of scrap in the near future. Mills are taking steady shipments but are not pushing for supplies. Cast grades are in demand from foundries.

San Francisco — While prices have advanced, little export business has been reported placed and it is understood that dealers specializing in export business have approached coast mills regarding available tonnages. No. 1 heavy melting steel is now holding at $17.00 to $17.50, San Francisco and Los Angeles, and No. 2 is quoted at $16.00 to $16.50 a gross ton, both places. Prices for this material, f.a.s. Los Angeles, hold at $18.50 to $19.50 for No. 1 and at $17.50 to $18.50 for No. 2. Heavy No. 1 cast scrap is $16.00 to $17.00 a ton, both in Los Angeles and San Francisco. Cylinder blocks range, on the average, from $17.00 to $17.50 a ton although as high as $19.50 has been paid in at least one instance.

Warehouse

Warehouse Prices, Page 89

Cleveland—Business continues active, making a favorable comparison with October. Prices are steady, with few changes in prospect.

Philadelphia—November sales to date are about even with October and although ahead of last year are behind the 1937 level. Inventories are increasing.

Buffalo—Sales so far in November are up to the level a month ago, with some sellers reporting small gains.

Cincinnati—Buying is steady, demand showing further diversification. Size of orders for bars and flat-rolled is tending to increase.

Seattle—Volume is seasonally normal but jobbing houses look for no active buying until January. Im-

INLAND FLOOR PLATE Gives 4-WAY Protection

1 **INCREASES SAFETY**—The cleated surface gives better, firmer traction in all directions. Accidents are fewer. Traffic moves faster—safely.

2 **SPEEDS PRODUCTION**—men and machines move faster over safe, firm floors.

3 **LASTS LONGER**—No other flooring material compares with rolled steel for strength, toughness and resistance to continuous traffic wear.

4 **CUTS FLOOR MAINTENANCE COSTS**—Inland 4-Way Floor Plate cannot split, chip, roughen. It is easy to clean—reduces maintenance cost to a minimum.

Write for booklet on Inland 4-Way Floor Plate—or order from your distributor

INLAND STEEL CO.

38 South Dearborn Street, Chicago

Sheets • Strip • Tin Plate • Bars • Plates • Floor Plates • Structurals • Piling • Rails • Track Accessories • Reinforcing Bars

Nonferrous Metal Prices

Nov.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin, New York *Spot	Straits Tin, New York *Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
11	Holiday										
13	12.50	12.50	12.75	51.00	47.50	5.50	5.35	6.50	20.00	14.00	35.00
14	12.50	12.50	12.75	51.00	47.00	5.50	5.35	6.50	20.00	14.00	35.00
15	12.50	12.50	12.75	51.00	47.50	5.50	5.35	6.50	20.00	14.00	35.00
16	12.50	12.50	12.75	51.00	47.12½	5.50	5.35	6.50	20.00	14.00	35.00
17	12.50	12.50	12.75	51.50	47.50	5.50	5.35	6.50	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper

Sheets

Yellow brass (high)	19.06
Copper, hot rolled	20.87
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	11.25

Tubes

High yellow brass	21.81
Seamless copper	21.37

Rods

High yellow brass	15.23
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.31

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.37½-8.50
Cleveland	9.25-9.50
Chicago	8.75-9.00
St. Louis	8.50-8.75

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	10.25-10.50
Chicago, No. 1	10.00-10.25
St. Louis	9.75-10.00

Composition Brass Turnings

New York	8.00-8.25

Light Copper

New York	8.00-8.25
Cleveland	8.25-8.50
Chicago	7.87½-8.12½
St. Louis	7.75-8.00

Light Brass

Cleveland	5.00-5.25
Chicago	5.62½-5.87½
St. Louis	5.00-5.50

Lead

New York	4.85
Cleveland	4.37½-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

Zinc

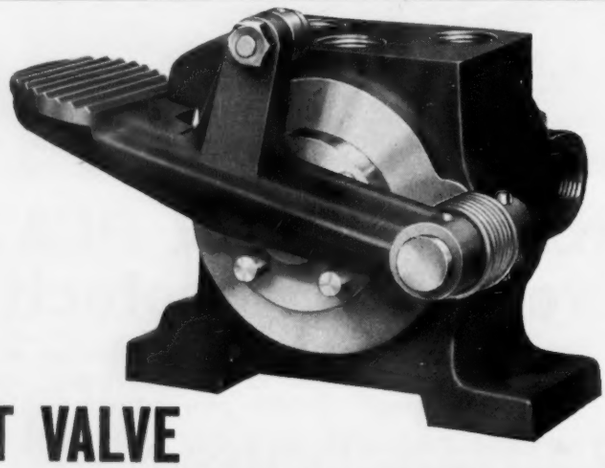
New York	3.50-3.75
Cleveland	3.25-3.50
St. Louis	3.75-4.00

Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	16.00-16.50
Misc. cast, St. Louis	8.25-8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.75
Standard No. 12 aluminum	15.00-15.25



FOOT VALVE
LEAVES BOTH HANDS FREE

This heavy-duty rotary air control valve simplifies control of many types of air equipment. One pressure operates the cylinder, second pressure reverses the cylinder. Disc-type design without packing stops leakage and packing maintenance troubles.

Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, rotary, electric and special models. Write for Valve Bulletin 34-S.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • *Pneumatic and Hydraulic Production Tool Equipment*

HANNIFIN "Packless" AIR CONTROL VALVES

portant public works projects promise a good demand. Bars, sheets and light plates are in best demand.

St. Louis—Business is steady at the rate of recent weeks and is unusually well diversified as to product and buyer.

Tin Plate

Tin Plate Prices, Page 86

Tin mill operations are steady at practical capacity, estimated at 95 per cent. The balance is due to small units not operating because of obsolescence, and it appears these mills will not be called into service. No new developments are reported on prices. It is the general consensus that any first quarter announcement will be held off until well into December, in order to take advantage of the latest possible conditions in the markets.

Nonferrous Metals

New York — Although undertone of nonferrous metals remained firm last week, a definite tapering in demand was noted. Approach of the inventory period coupled with the well-covered position of consumers and lack of any stimulating news was attributed as the cause for this slackening in the buying pace.

Copper — Resale electrolytic copper appeared firmer with prices ranging from 13.00c to 13.37½c, Connecticut. Consumers needing metal for delivery over the balance of this year generally must buy on the outside market and pay premiums since producers' supplies of prompt metal are limited. All first hand sellers again quoted electrolytic at 12.50c.

Lead — Producers generally balanced their daily intakes but demand was not as pressing as during the previous week. Prices held firm at 5.35c, East St. Louis. It is estimated that refined lead stocks dropped about 20,000 tons during October, bringing the total to around 77,000 tons, a new low for many years.

Zinc — Buying was rather light but at the same time it was at a satisfactory pace in view of the producers' well-sold position. Prime western held at 6.50c, East St. Louis, while high grade was firm at 7.50c, delivered. Galvanized sheet output has slipped to 78 per cent of capacity, one point under the high for recent years.

Tin — Straits spot remained unusually steady at around 51.00c early in the week before rising to 51.50c on Friday. The market was still quoted on a nominal basis due to the limited offerings.

Steel in Europe

Foreign Steel Prices, Page 89

London—(*By Cable*)—Announcement of new steel prices in Great Britain has released substantial commercial demands, which have been partly covered by mills, subject to government priority orders. Expanding export demand is also being partially met. Supplies of pig iron, ore and coke are adequate. Steelworks are operating at capacity and larger imports of semifinihed steel from the Continent are being negotiated.

Belgium and Luxemburg report substantial export inquiries with prices fluctuating. The raw material situation on the Continent has been much improved.

Ferroalloys

Ferroalloy Prices, Page 88

New York — With steelmaking continuing active, movement of ferromanganese remains heavy. It is believed in some quarters prices may undergo a further increase when books are open for first quarter, and should this develop, heavy shipments will likely be maintained until the end of the year. The market on contracts continues $100, duty paid, Atlantic and Gulf ports, and this price can also be done on spot shipment, although one seller advanced his price $10 a ton on spot the beginning of this month. Domestic spiegeleisen, 19 to 21 per cent is firm at $32, Palmerton, Pa., and 26 to 28 per cent material at $39.50. Other leading ferroalloys also are steady.

Equipment

Chicago — Machinery and machine tool interests find inquiries increased rather substantially. Bookings, however, slowed down a bit toward the end of last week but were about 15 per cent ahead of the same period last month. Sellers are quoting more extended deliveries. Demand remains well diversified. Several new railroad lists include one by Milwaukee road which is the most substantial in some time.

Seattle—Electrical items and automotive equipment remain active although other lines show seasonal apathy. Bonneville Authority has awarded to American Bridge Co. a $387,444 contract to furnish an unstated tonnage of steel reinforced cable for power lines. Both Westinghouse and General Electric motors are specified for Seattle's new transportation system.

TNEC Steel Hearings To Resume in January

(*Concluded from Page 34*)

continue the manufacture of this product.

"In so far as the South Chester Tube Co. is concerned, as has been stated this afternoon, neither the National Tube nor a meeting of the other mills feel they should take the responsibility of determining or suggesting any policy for us to follow, as they would not want to be confronted at Washington, since we make no other product in the way of pipe, and not even any other products manufactured of steel.

"We are handing this to Mr. Sweet, and we need not advise that this information is of the most confidential nature.

"Prior to the meeting of the mills, other than the National Tube, we are going over this matter with our source of confidential information. This meeting will be held probably Monday or Tuesday of next week and, within an hour after it adjourns, we hope to have exactly what transpired."

There was a great deal of cross examination regarding the memorandum. Mr. Gibson denied in his testimony that any of the events spoken of in the memorandum had eventuated and further denied that there had been anything but informal meetings or conferences. Mr. Gibson testified that no formal meetings had ever been held, that he had never been invited to any, and that he did not know of a single one.

None of the things in the memorandum, the witness stated, had transpired. He informed the committee that the memorandum was written as the result of rumors going on around Pittsburgh which he had picked up and in which he thought his home office would be interested.

He was pressed to tell the names of those whom he had talked to before writing the note and said that he could not remember their names. Leon Henderson entered into a great squabble with Mr. Gibson and finally told him he did not believe him when he said he couldn't remember the name of a single person with whom he had talked before writing the note.

During the course of this testimony the tubular manufacturers representatives went into detail regarding tubular prices in 1938 and spoke about the competition between lapweld and seamless pipe. They also discussed for the committee the

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whole story of marketing events in 1938.

Mr. Schaefer stated that in the latter part of August and the first two weeks of September, 1938, the lapweld market was in much better shape than it had been up to that time. However, the latter part of September, 1938, he testified, there was an upset in conditions due to the fact that the price of grade B seamless was reduced to the level of lapweld products. There was no general announcement when the reduction was made, the witness said, but it did not take long to get around in the trade. He said that he heard of its being offered to the trade by the Oil Well Supply Co., a subsidiary of the U. S. Steel.

J. E. Goble, vice president, National Tube Co., told the committee his company had not withdrawn the price of grade B seamless pipe. He explained what had occurred in connection with testimony which had already been given. He said that grade B was a new product and that his company found that some of the oil companies were adapting this new grade of seamless for jobs for which his company did not think it was suitable.

It was stated by the witness his company therefore instructed its field men not to take any orders for grade B seamless but to send the inquiries along to Pittsburgh where its own engineers could ascertain if the order was for a shallow or deep well. If it were for a deep well, he testified, the National Tube would not take an order for grade B.

National Tube, said Mr. Goble, has about 35 per cent of the capacity of the tonnage of its industry and that it always made an effort to get that proportion of the business available. He said it could not always be obtained. It should get its share, he said. If it doesn't, he remarked, there is something the matter either with its price or product.

Witness said that when grade B seamless was substituted for lapweld the matter of the policy was undoubtedly referred to the parent company. Mr. Goble said his company must have known the new product and the price reduction would be an unpleasant surprise to its competitors.

He stated he had not conferred with any of his competitors about this new product, grade B seamless, but that some of his customers had been consulted about it and in that way perhaps his competitors may have heard about it.

Describes Fabricators' Group

He said that if this grade B were sold at prices comparable to lapweld that it would mean his company could participate in some of the business which it had not been getting. A good many other manufacturers of tubular products, he said, had been operating at a greater capacity than National Tube.

Mr. Goble told the committee that since he has been with National Tube he has only conferred with his competitors two or three times. He testified that the tonnage which his company booked during the six days on which its prices were reduced in September, 1938, did not amount to very much. He termed it "disappointing." Since that time, however, he said the company has gotten back some portion of its lost business.

T. A. L. Loretz, general manager, Pacific Coast Steel Fabricators association, told the committee his organization includes steel fabricators in California, Oregon and Washington. They are not steel manufacturers. They fabricate buildings, bridges, steel tanks, silos; three are shipbuilders.

Association was organized in 1935 during NRA code days and one of its principal jobs is to restrict the dumping of iron and steel products on the Pacific coast in the territory

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covered by the association. Property valued at $21,000,000 is represented by the association he said.

Mr. Loretz spoke of the competition between West coast fabricators and those in other districts. The freight situation, he said, makes the competition easier because of the cheap water transportation rates. He said U. S. Steel has no fabricating facilities on the West coast while Bethlehem has three shops. The latter, he said, gets its steel from its own plants.

The witness asserted steel prices in California, Oregon and Washington are based not on cost of production in the West but on the eastern price of steel, plus transportation charges.

Mr. Loretz said that eastern prices, plus transportation, are charged on the Pacific coast even though some of the steel actually is manufactured at West coast plants.

However, in answer to a question by Isador Lubin, commissioner of labor statistics, Mr. Loretz said: "I wouldn't say I'd like to see additional capital employed on the Pacific to set up new plants that would relate their prices to actual West coast manufacturing costs.

Relations Pleasant

"Our relations with Bethlehem and United States Steel have generally been very pleasant," he said. "Our only quarrel is that prices are not based on cost."

The witness, who said his association consisted of about 25 independent steel fabricators, admitted he had "no suggestion as to how the steel companies could be prevailed upon" to make a more satisfactory price.

He said Pacific coast fabricators, handicapped by the disproportionate steel price, were able to obtain only 27 per cent of Pacific coast business in the 18 months ended June 30, while fabricating subsidiaries of United States Steel and Bethlehem cornered more than 65 per cent.

Besides the Steel corporation's failure to take into account the allegedly lower costs of their Pacific coast mills, Mr. Loretz complained of a system of railroad rates referred to as "F. I. T." (fabrication in transit).

The system, he said, permits steel that is manufactured in Chicago, for example, and shipped to Birmingham for fabrication, to be sold for less in Phoenix, Ariz., than steel manufactured and fabricated in Los Angeles, which is about 1800 miles nearer Phoenix than Birmingham.

Still another grievance voiced by Mr. Loretz is the "land grant" rate system, whereby "land grant" railroads charge government shipments a rate much lower than normal.

Construction and Enterprise

Ohio

CLEVELAND — Sabin Machine Co., H. B. Sabin, 6538 Carnegie avenue, president, will soon let contract on 40 x 100 foot addition to factory. Christian, Schwarzenberg & Gaede, 1836 Euclid avenue, architects and engineers.

DAYTON, O.—Materiel division contracting officer, Wright field, will receive bids until 10 a.m., Nov. 24 on four air riveters, one 1-shot pneumatic riveter and two air drills; 10 a.m., Nov. 27, one diesel engine powered, ⅝-yard capacity, full revolving crawler type shovel; 10 a.m., Nov. 28, 112 tow target windlass electric motors and eight hardness testing machines; 10 a.m., Nov. 30, six press arbors, one bench type turret punch, 221 hand power bench grinders, one motor driven horizontal universal shaper, three 3000-pound capacity crane type electric trucks; 10 a.m., Dec. 1, 181 portable pneumatic screw drivers; 10 a.m., Dec. 4, 610 carbon dioxide type fire extinguishers and 20 electric power plants, Air Corps type B-3; 10 a.m., Dec. 5, sixty-three 2-ton spur gear chain hoists and eight 5-ton spur gear chain hoists.

FT. LORAMIE, O.—Village, O. H. Slattery, mayor, voted in favor of $10,000 special bond issue for waterworks im-

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provements to cost $54,288. Will receive WPA help. Carl Simon, Van Wert, O., engineer.

GNADENHUTTEN, O.—Village, R. M. Blackburn, mayor, has approved $35,000 special bond issue for construction of sewage disposal system to cost $130,000. Will obtain WPA aid. Henry Moore, New Philadelphia, O., engineer. (Noted Sept. 25).

LAKEMORE, O.—Village, Charles E. Michaels, mayor, has approved $25,000 special bond issue for construction of sewage disposal plant and system to cost $162,000. Will receive WPA assistance. Paul W. Elwell, 5005 Euclid avenue, Cleveland, engineer. (Noted Oct. 16).

LIMA, O.—City, A. L. Metheany, mayor, plans improvements and additions to waterworks system at cost of about $468,000. Will file application for WPA aid. Thomas D. Quinn, city engineer.

SEAMAN, O.—Village, E. S. Young, mayor, has passed $20,000 special bond issue for waterworks improvements. Burgess & Nipple, 568 East Broad street, Columbus, O., engineers.

New York

BUFFALO—Curtiss Aeroplane division, Curtiss-Wright Corp., Kenmore avenue and Vulcan street, Tonawanda district, plans installation of motors and controls, conveyors, electric hoists, other equipment in new addition to aircraft plant to be used for extensions to assembly department. Cost, $225,000.

OSWEGO, N. Y.—Central New York Power Co., Electric building, Buffalo, plans new steam generating unit to cost about $7,000,000. Burns & Roe Inc., 233 Broadway, New York, engineers.

Pennsylvania

EMLENTON, PA.—Quaker State Oil Refining Co., Chambers building, Oil City, Pa., plans various alterations to refining plant, including installation of additional steam and electrical generating equipment, and apparatus to improve lubricating oil quality. Plants here, at Farmers' Valley, Pa., and St. Mary's, W. Va., to be affected. Total cost approximately $300,000. Owner will let separate contracts and supervise construction with own engineering department. G. B. Hunter is general superintendent at Emlenton.

TITUSVILLE, PA.—Pennsylvania Refining Co., John A. Beck, president, Butler, Pa., plans installation of 75-ton refrigerating machine, two 40-plate presses, other equipment and additions to plant; estimated cost, $50,000. Contracts will be let soon. Adam Mosher is Titusville superintendent.

WAYNESBURG, PA.—Borough, K. W. Scott, Borough building, secretary, has completed plans for a sewage disposal plant to cost approximately $140,000. Will be ready for bidding soon. Charles C. McCall, Borough building, engineer.

WILLIAMSPORT, PA.—Lycoming Mfg. Co., E. D. Herrick, president, is altering plant, building addition. Private plans, to cost $40,000.

Indiana

COLUMBUS, IND.—Cummins Engine Co. has placed contract for construction of modern research laboratory. Plant will be 80 x 120 feet, equipped with machinery to test diesel engines and materials of which they are built.

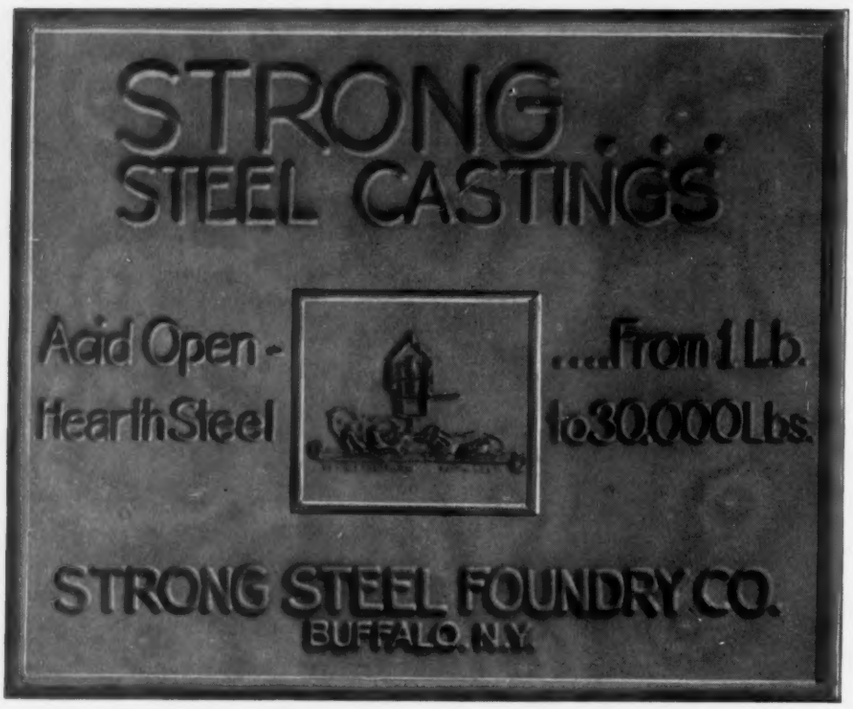
FT. WAYNE, IND.—Board of public works, R. G. Beam, chairman, receives bids until Nov. 28 for one 15,000-kilowatt turbine generator unit and auxiliary equipment, including surface condenser, for installation in municipal power plant where expansion and improvements will be made. Bids for accessory equipment will be asked later. Entire project to cost nearly $560,000. Otto Adams, engineer in charge.

INDIANAPOLIS — Logansport Spring Co. Inc., Park and West Broadway, Logansport, Ind., has filed articles of incorporation. Richard E. Riewoldt, Walter L. Myers and Warren J. Conrad incorporators, with 500 shares no par value. Corporation formed to manufacture springs and metal stampings.

INDIANAPOLIS — Hydraulic Compressed Metals Inc., 614 Union Title building, has filed articles of incorporation. Edward Lustgarten, Paul R. Lustgarten and Robert Goetcheus, incorporators, with 100 shares no par value stock. Corporation formed to manufacture and sell metal and metal products.

Minnesota

CLOQUET, MINN.—Northwest Paper Co. plans to start construction on addition to its paper mill, to cost about



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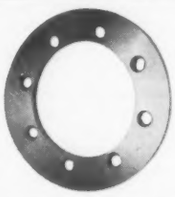

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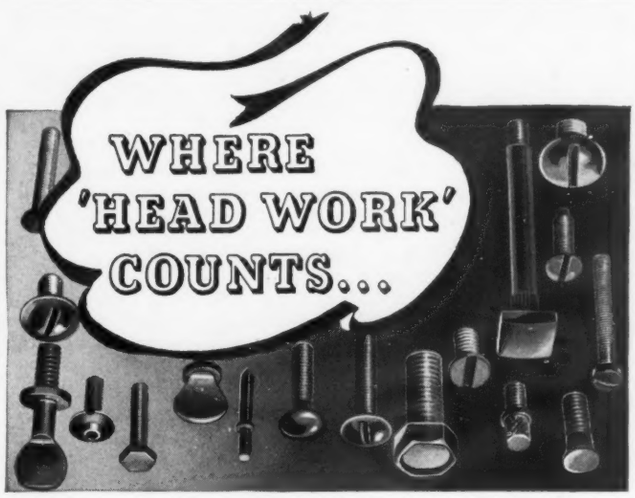

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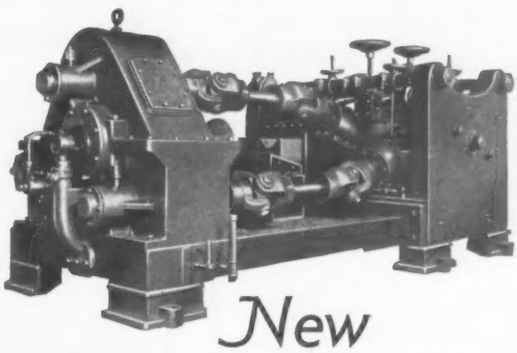

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HENNING, MINN.—Village, K. W. Anderson, clerk, is taking bids to 7 p.m., Nov. 23, on diesel engine generating machinery, installed, with all auxiliaries and accessories and for construction of electric distribution system as per specifications on file with Burlingame, Hitchcock & Estabrook, 521 Sexton building, Minneapolis, consulting engineers. Certified check 5 per cent to accompany bid.

MINNEAPOLIS—Ritefit Mfg. Co., J. H. McGuffie, president, has awarded contract for construction of a 42 x 60 foot 1-story addition to machine shop to S. G. Collins, Thorp building.

RED WING, MINN.—Board of water commissioners, J. C. Friedrich, president, is taking bids to 7 p.m., Dec. 6, on installation of one 187-kilovolt-ampere alternator and motor for water pumping operations. Specifications on file with J. F. Enz, city engineer. Certified check 10 per cent to accompany bid.

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GARAGE IN CONNECTION

Texas

CORSICANA, TEX.—Navarro County Electric Co-operative Inc. has received $75,000 REA allotment to finance rural electrification.

CRYSTAL CITY, TEX.—Crystal Canneries Inc. will let contract on canning factory improvements, new power plant, new treating plant, preheating unit, additional machinery and equipment. Total cost to be over $40,000.

HOUSTON, TEX.—City, Oscar F. Holcombe, mayor, approved special $400,000 bond issue for construction of incineration plant. (Noted Oct. 30).

HOUSTON, TEX.—Harris county water control and improvement district number two, E. R. Anderson, president, receives bids Nov. 27 for waterworks materials and supplies. H. G. Olmsted, engineer, Box 1016, Houston.

MERCEDES, TEX.—Central Power & Light Co. will double capacity of vegetable quick-freezing plant.

SAN ANTONIO, TEX.—Hobbs Mfg. Co., 1001 Throckmorton street, Ft. Worth, Tex., is establishing complete trailer building, servicing and distributing factory.

Kansas

GIRARD, KANS.—Se-Kan electric co-operative association has $220,000 REA allotment to finance 212 miles rural electric transmission line. Paulette & Wilson, 311 Farmers' building, Salina, Kans., engineers.

North Dakota

GRAND FORKS, N. DAK. — Walsh Rural Electric Co-operative Inc., Grafton, N. Dak.; Red River Electric Co-operative Inc., Hillsboro, N. Dak.; and Five Star Rural Electric Co-operative Inc., Lakota, N. Dak., have merged under the name of Nodak rural electric co-operative, with headquarters here. Will construct several hundred miles rural transmission line in several counties. Tentative plans call for a central power plant to be built at Fordville, N. Dak.; E. A. Walters is secretary and treasurer.

South Dakota

STURGIS, S. DAK.—Cody Bentonite Co., D. W. Cody, president, is building an all-steel bentonite mill to cost about $75,000. Mill capacity will be 100 tons daily.

Nebraska

LEXINGTON, NEBR.—Dawson county public power district has $30,000 REA loan for rural transmission line in the county.

OMAHA, NEBR.—City, Harry Trustin, engineer, has rejected all bids, will take new bids to Dec. 6 on construction of sewage disposal plant to cost about $600,000.

STROMSBURG, NEBR.—Polk county rural public power district has been allotted $50,000 REA loan to finance rural transmission line in Polk county.

Iowa

COUNCIL BLUFFS, IOWA—Chicago & North Western Railway Co., 226 West Jackson boulevard, Chicago, plans construction of a 1-story machine and maintenance shop, 100 x 150 feet, to cost approximately $75,000 exclusive of equipment.

DUNCOMBE, IOWA—City, John W. Brown, clerk, recently approved, at a special election, installation of a diesel engine at its municipal light and power plant.

NEWHALL, IOWA—City, Henry Jacobsen, mayor, approved special $18,000 bond issue to finance construction of waterworks plant. Howard R. Green Co., Cedar Rapids, Iowa, consulting engineer.

WIOTA, IOWA—Village, Carl L. Reed, clerk, has approved special $4000 bond issue to finance construction of waterworks plant.

Colorado

DENVER—Bureau of reclamation receives bids until Nov. 27 on one 7000-horsepower vertical shaft hydraulic turbine; one actuator-type governor with pumping apparatus to control turbine; one 6000-kilovolt-ampere three phase 60 cycle alternating current generating unit; three 2000-kilovolt-ampere 2300 to 19,050/33,000 Y volt self-cooled oil immersed single phase transformers; circuit breakers, switches and other equipment for installation in Minidoka hydroelectric power plant project, in Idaho.

Wyoming

GREYBULL, WYO.—City plans to hold special election to vote on construction of municipal power and light plant.

Montana

LIVINGSTON, MONT.—Park electric co-operative, F. E. Kistner, president, is preparing detailed plans for extending its rural transmission line to Ft. Ellis, Mont., and vicinity. REA has given preliminary approval. J. M. Garrison, state water conservation board, Montana building, Helena, Mont., consulting engineer.

Idaho

ASHTON, IDAHO—Fall river co-operative has been granted REA allotment of $89,000 for rural transmission line.

GRANGEVILLE, IDAHO—Idaho county light and power co-operative has $143,000 REA fund for rural transmission line construction.

RICHFIELD, IDAHO—Newly formed co-operative has been allotted $87,000 REA loan for rural transmission line.

Pacific Coast

CHINO, CALIF.—State department of public works, division of architecture, Sacramento, Calif., plans to call for bids soon on new power plant and equipment at Southern California state prison. Work to be carried out in conjunction with several other new buildings. Total cost of project, over $1,000,000.

COQUILLE, OREG.—Coos bay co-operative has $119,000 REA allotment for rural transmission line.

RITZVILLE, WASH.—Big Bend electric co-operative, John S. Gray, representative, has been granted $267,000 REA allotment for rural transmission line.

SEATTLE—Rogers Engineering Corp., 223 McDowall building, has been organized by Frank E. Rogers and associates to deal in motors, engines and machinery. Capitalized at $50,000.

WINTHROP, WASH.—Okanogan county co-operative has secured $66,000 REA loan for rural transmission lines.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

American Engineers Lead

To the Editor:

Listening to H. A. Brassert addressing the Eastern States Blast Furnace and Coke Oven association at Cleveland last week (STEEL, Nov. 20, p. 42) I was impressed by the good fortune of the United States in its iron ore and fuel supplies.

His summary of the situation in principal steelmaking countries bears the stamp of authority as he has been closely associated with the development of blast furnace and other plants in most European countries and has analyzed the sources of supply.

In the United States there is ample supply of ores of high grade and an inexhaustible store of fuel. While for the most part these are situated several hundred miles apart the presence of the Great Lakes with their northern end close to the ore and their southern close to the ore provides a low-cost channel of communication to make each available to the other. European countries almost without exception suffer under the handicap of lack of ore or fuel or the former is of low grade, requiring special equipment to make it commercially profitable.

Another thought was born while listening to Mr. Brassert, that while in the United States it has not been necessary to resort to low-grade iron ores, as the supply of better grades is sufficient, American engineering skill has been called on to design equipment for utilizing lean ores, both Great Britain and Germany having installations by our engineers for this purpose.

Not only in production of pig iron, but in making steel into finished forms does Europe turn to American design, as told in STEEL, (Nov. 13, p. 51). It is remarkable that the usually conservative European attitude has been modified sufficiently to adopt so much American practice as is outlined in the observation of the American steel engineer quoted in this article.

It is a high tribute to the skill of steelmakers in this country and emphasizes the leadership toward which American industry has been tending for many years, illustrated also in machine tools, automotive and other lines.

ENGINEER

Chicago

Beehive Coke as Barometer

To the Editor:

One evidence of the substantial nature of the present advance in steel production is evident to us in the beehive coke regions. Ever since by-product coke took the center of the stage beehive fuel has been the Cinderella of the family. Ovens lie idle whenever the steel industry is running light and we are the first to suffer when contraction starts.

On the other side of the picture, when blast furnaces are lighted and steelmaking gets into the higher percentages the by-product ovens find the burden greater than they can bear and the beehives begin to hum.

Report of the bureau of mines, just reaching my desk, states that beehive coke output for the week ending Nov. 11 was 77,400 net tons, an increase of 10 per cent over the preceding week and approximately six times the tonnage made in the corresponding week last year.

We know from past experience that heavy call for our coke does not develop until steelmakers feel themselves on firm ground for the immediate future and relight their blast furnaces to obtain sufficient pig iron for their needs.

For this reason we are looking for continued activity through this winter, basing the belief on our own pet indicator, regardless of the stock market and other economic factors, which may or may not agree.

BEEHIVE

Uniontown, Pa.

Beware the Check-Off

To the Editor:

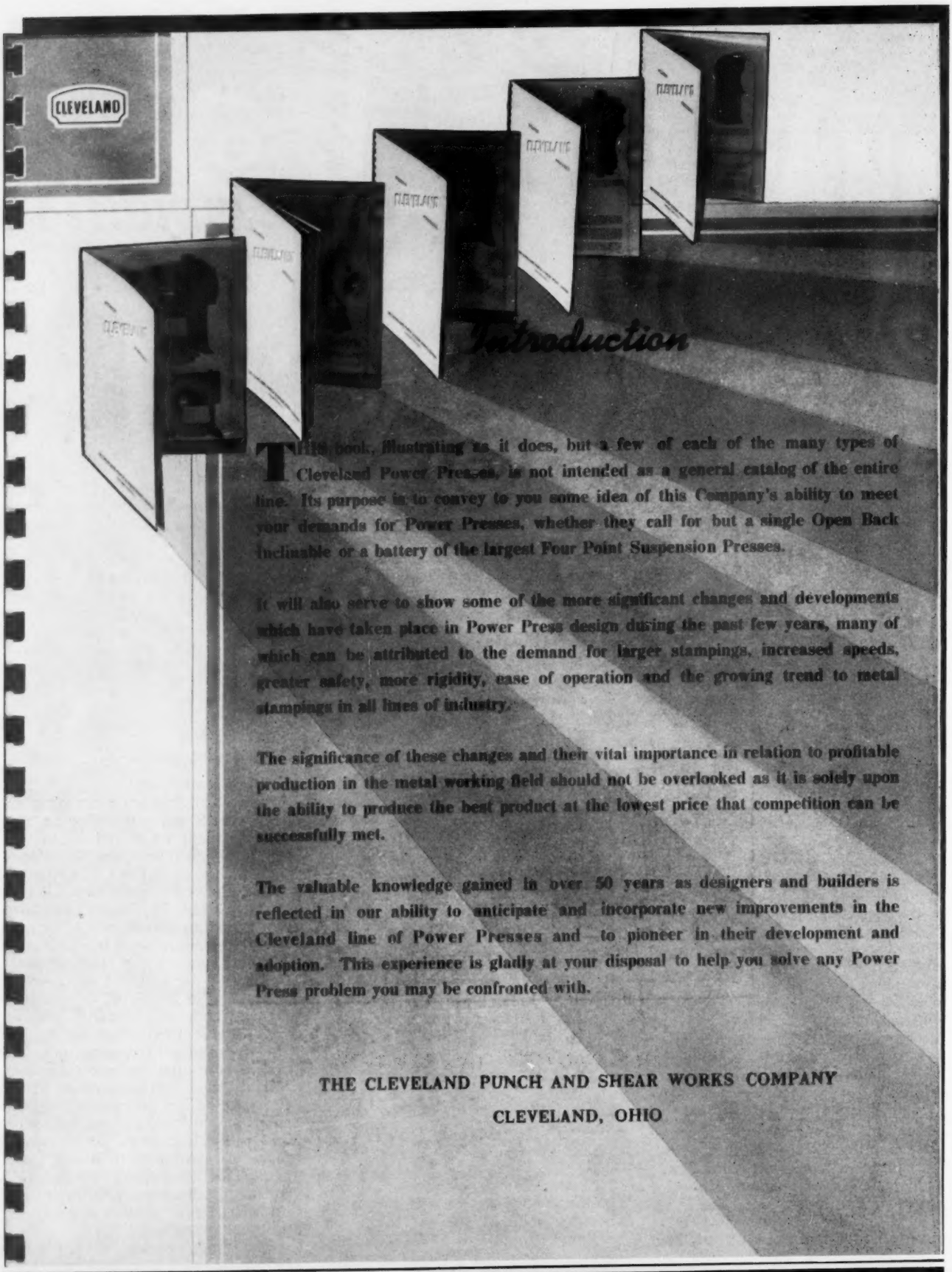
A most suggestive news item appeared in STEEL a week or so ago, which should be called to the attention of all workers threatened with inclusion in the CIO organizations. The statement was made that United Mine Workers' executives had levied an assessment of $2 each on all members working five days or more per month, the proceeds to be used for political purposes.

Under the check-off this assessment, which was ordered without vote of the members, will be deducted from pay envelopes of workers without their consent, assuring full payment. Present effort of the CIO is to obtain the closed shop and check-off in the automotive, steel and other industries, which would place all workers in these great groups at the mercy of the self-constituted leaders whenever they desired a few million dollars for political purposes.

The wage earner should pause before taking action leading to such a situation, especially as funds raised by this means are expended without regard to the wishes of the rank and file.

OPPOSED TO CIO

Detroit



Introduction

This book, illustrating as it does, but a few of each of the many types of Cleveland Power Presses, is not intended as a general catalog of the entire line. Its purpose is to convey to you some idea of this Company's ability to meet your demands for Power Presses, whether they call for but a single Open Back Inclinable or a battery of the largest Four Point Suspension Presses.

It will also serve to show some of the more significant changes and developments which have taken place in Power Press design during the past few years, many of which can be attributed to the demand for larger stampings, increased speeds, greater safety, more rigidity, ease of operation and the growing trend to metal stampings in all lines of industry.

The significance of these changes and their vital importance in relation to profitable production in the metal working field should not be overlooked as it is solely upon the ability to produce the best product at the lowest price that competition can be successfully met.

The valuable knowledge gained in over 50 years as designers and builders is reflected in our ability to anticipate and incorporate new improvements in the Cleveland line of Power Presses and to pioneer in their development and adoption. This experience is gladly at your disposal to help you solve any Power Press problem you may be confronted with.

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